THE HEATING AND VENTILATING MAGAZINE

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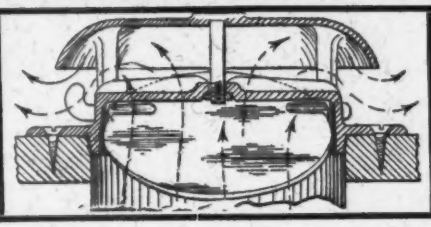

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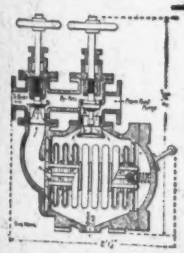

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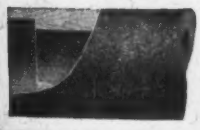

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THE HEATING AND VENTILATING MAGAZINE

1123 BROADWAY NEW YORK JUNE, 1911

*Methods of Connecting Hot Water Heating Systems to a District Heating System**

BY A. C. ROGERS,

TOLEDO (O.) RAILWAYS AND LIGHT CO.

The subjects and business connected with a public service company have a peculiarity all their own, and in taking up this subject the relation between the public and the heating company, and the generally abnormal demands by the public of the public service company, will have its influence on the engineering department as well as on other branches. In the heating branch the consumer will ask for and expect results that if he were supplying himself would not be enjoyed nor figured for. This can be illustrated by citing the case of a heating system locally run in the consumer's building, and, so far as good results or economy are considered, never approached nor enjoyed, but if that same system is connected to a district heating company, a demurrer to any changing or any waiver of anticipated good will have to be forced from the consumer by a series of demonstrative talks, giving the whys and wherefores in a very lucid manner.

In the drawings the same reference letters are used to designate the same points:

A represents the heating company's service pipes into building.

B represents the house system feed main or flow pipe.

C represents the house system return main.

D represents the radiator supply and return branches.

E represents a valve or blank flange on boiler feed to flow main.

F represents the same on return pipe or main.

G represents the service valves on district supply service inside building wall.

H represents the heating company's regulating valve on return pipe of service.

J represents the connection of service flow into B.

K represents the connection of service return into C.

L represents drip or drain connections.

M represents regulating cock or valve on return branches.

N represents a small pipe by-pass in system Fig. 6.

O represents a disc or regulating cock by-pass in system Fig. 7.

P represents a by-pass of full pipe with radiator branches taken off with "y's" or branch tees.

R represents a secondary garage service.

S represents a by-pass with customary three valves to form it.

Before describing each plate or illustration, let me state that district hot-water heating is a forced feed and

*Read before the third annual convention of the National District Heating Association, in Pittsburg, June 6-8, 1911.

that the best results and greatest economy come from maintaining a gravity flow and outflow to all radiators. By reason of this forced feed all heating systems are very sensitive, some more than others, but, as a class, very much more than a regular gravity heating system. A trap is detrimental to gravity heating, and is fatal to that part when trapped on a pressure gravity system.

A general supervision of house installations when connected to district heating is incumbent upon the engineering department of the heating company. This holds good for hot water as well as steam heating, and is largely practiced by all companies. As regards new work, this presents a problem that may be easily accomplished, but when contemplating heating systems already installed and being locally heated the engineer may expect to meet difficulties both in the system and with the owner. An owner may be indifferent to results and economy when running his own heating plant and yet may be very exacting when getting service from a district heating company. The engineer often meets with systems that cause him to wonder how heating was ever thought of or accomplished.

In considering this subject, a valuable asset to the writer is the experience of connection with a district heating company and the results by the department with which he is detailed.

In Fig. 1 we illustrate a system that was used more some years ago than now, although when properly laid out and installed gives very good results. The feed of all radiators is taken off the top of the main and the return is put into the side of the main. In this system there is a gradual drop in temperature as the water flows along the main, due to the cooled water in the radiators dumping back into the main and the radiators must be figured for this drop to give the results desired. The method of adjusting for district heating in this case is as follows:

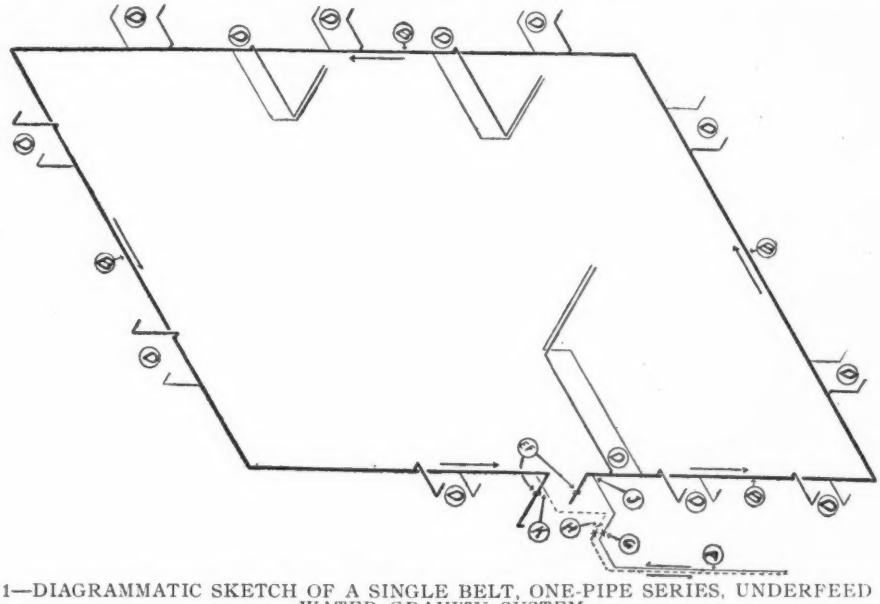


FIG. 1—DIAGRAMMATIC SKETCH OF A SINGLE BELT, ONE-PIPE SERIES, UNDERFEED HOT-WATER GRAVITY SYSTEM

The boiler is cut out by putting valves in the flow and return pipes or blank flanges or blind gaskets in flange unions, as at E F; the expansion tank is cut off by valve or by capping or plugging the leads to it; the service is cut in by tapping the main at J and K. Service valves G are always put on service inside building wall, and regulating valve H is placed on the service return pipe just before leaving the building; by proper adjustment of H the results are fully up to all that was ever accomplished by local heating, if not better.

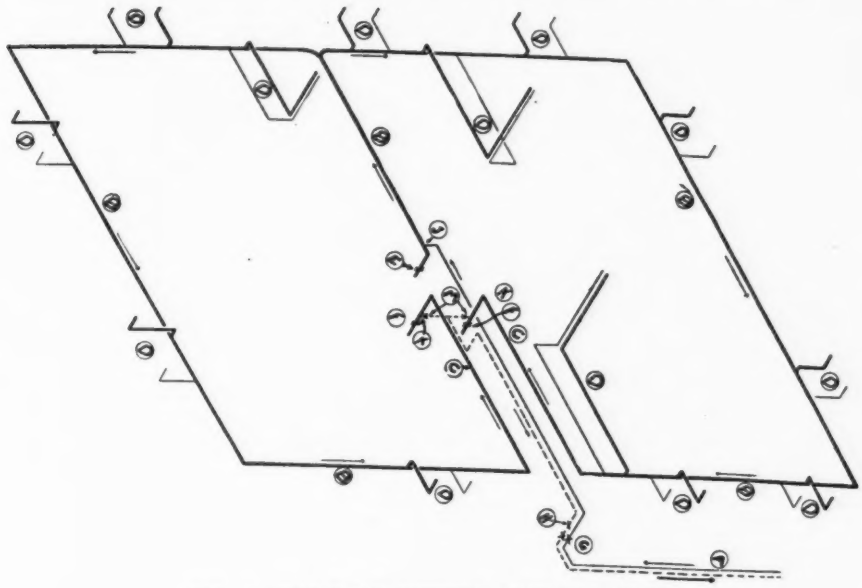


FIG. 2—TWO-BELT SYSTEM, SIMILAR TO FIG. 1

In Fig. 2 a system the same as Fig. 1 is illustrated, except the system has two belts and, in addition to the instructions for Fig. 1, the return has two connections, and regulating cocks M are installed on both returns and adjusted to equalize both belts, preventing a short circuit in either belt and giving an equal distribution.

Fig. 3 is an illustration of the well-known two-pipe underfeed gravity, and the following method is given: Blank off boiler at feed and return and also expansion tank; tap feed service in at boiler as at J, and tap return in extreme end of return main away from boiler as at K; this method prevents short circuiting and promotes a balancing that is otherwise troublesome.

Fig. 4 is an illustration of a single-belt, two-pipe, underfeed gravity, with parallel mains, but opposing flow. The writer would place this system at the head of all underfeed work. The mains of themselves will practically

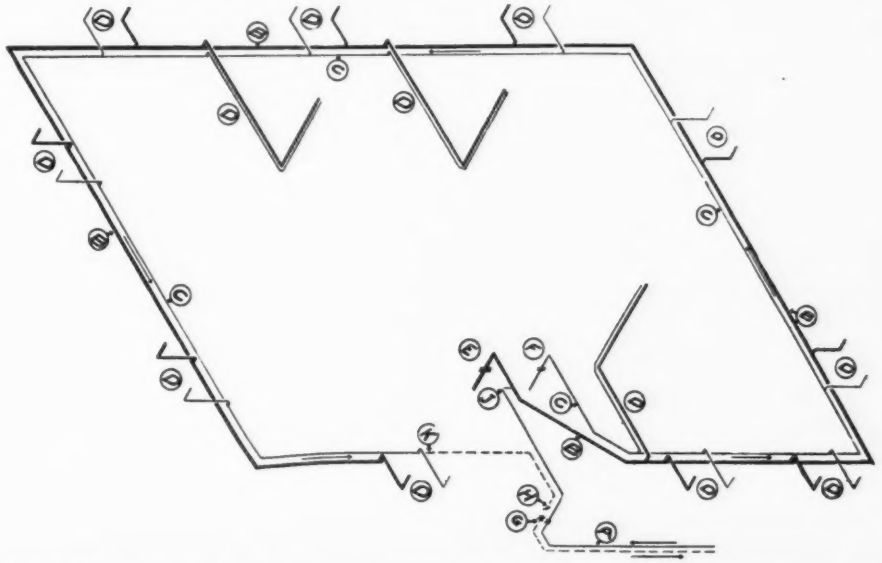


FIG. 3—ONE-BELT, TWO-PIPE, UNDERFEED GRAVITY SYSTEM, WITH PARALLEL MAINS

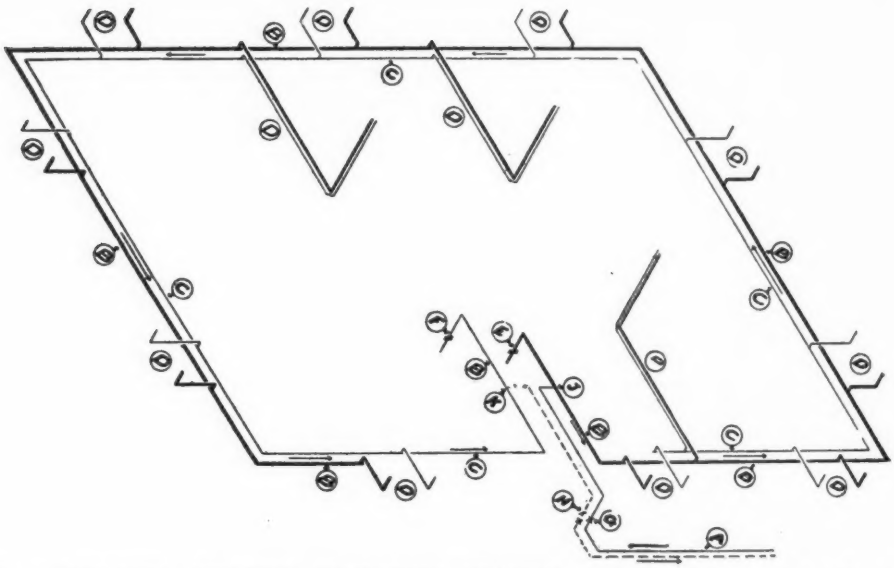


FIG. 4—ONE-BELT, TWO-PIPE, UNDERFEED GRAVITY SYSTEM, WITH PARALLEL BUT OPPOSED MAINS

make a balance to the job, and a building, even though quite large, with clearance for mains, can be accommodated on one belt. This job will work gravity, without pitch to mains, providing the size of mains is liberal. The method of connecting to district heating is readily outlined.

Fig. 5 is a sketch of only a portion of a multiple underfeed system, only the headers being shown. We meet this work sometimes and make the following for connecting: Tap main flow header at J and tap each return marked C at K, installing a cock M for regulation on each unit; the boiler is blanked off as before at E F; by adjusting M with opening in each to suit the duty, a balance is made and short circuiting prevented.

Fig. 6 is a one-pipe, forced-feed series system and for district work only, where at one time it was universal for district work; the sketch shows the pipe main carried along between the radiator branches, which is called a by-pass, and the sketch shows three different kinds—first, a small pipe by-pass N, the pipe being smaller than the main favors a flow through the radiator; next, a by-pass with cock for adjustment or a union with a disc with a hole of proper size (this is shown at O); and, next, a full by-pass as at P, with branches taken off with Y fittings or branch tees; there are some places such as shown in Fig. 11 where this system is the only way, but for house or residence work this system is not allowed any more.

Fig. 7 shows a forced-feed heating coil, such as for factory and garage work; the feed is connected to the bottom of coil and return is out the top; by this method a full pipe is assured and the coil is self-freeing of air, all air being driven out and no air vents being needed; the sketch shows a coil running along the wall with right-angled branch and a continuation through to another room; headers cannot be used in this work on account of short circuits and a return

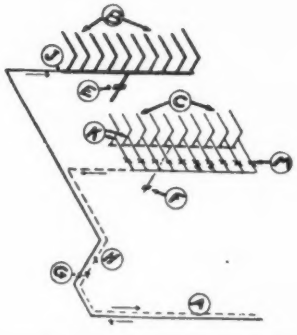


FIG. 5—HEADERS AT THE BOILERS OF A MULTIPLE UNDERFEED GRAVITY SYSTEM

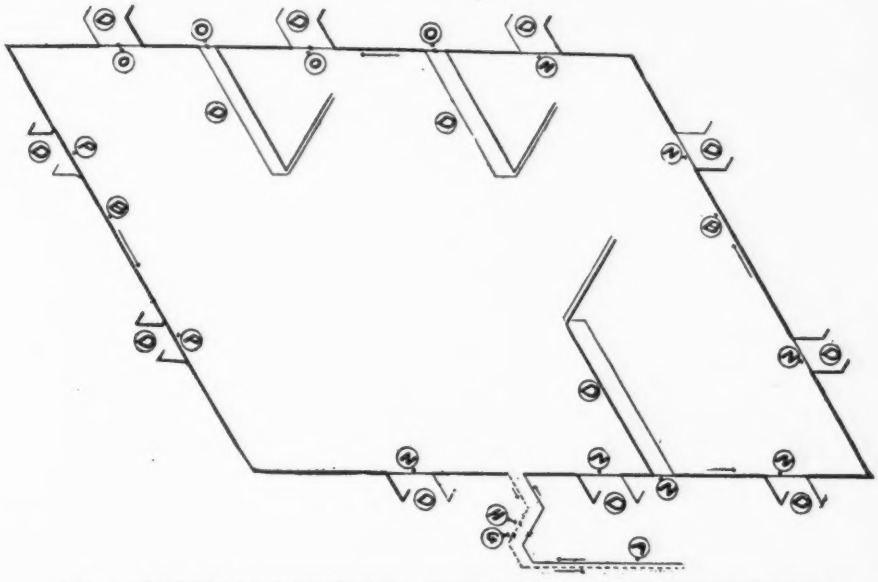
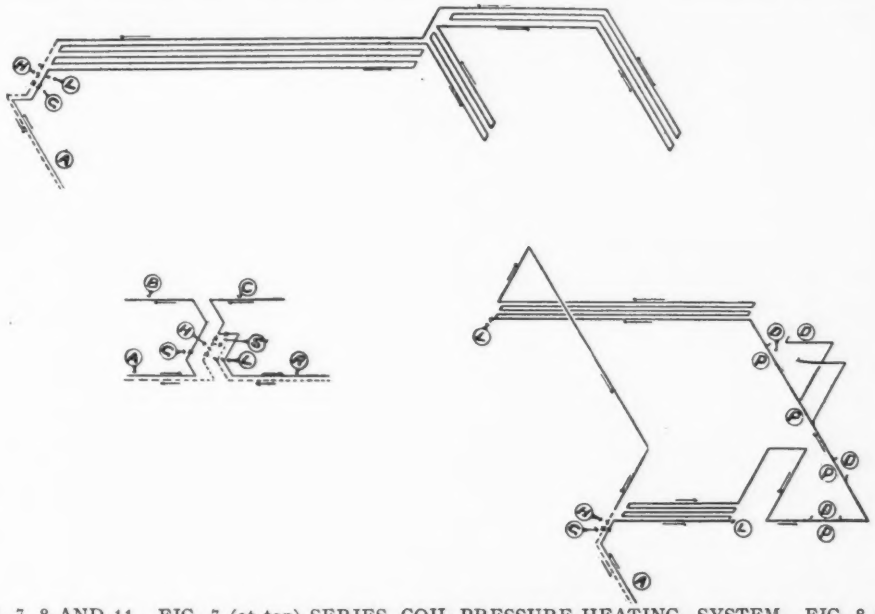


FIG. 6—ONE-BELT, SINGLE-PIPE SERIES, PRESSURE GRAVITY SYSTEM

bend coil is used; where a header coil is met with, discs or cocks for regulation in each coil pipe are necessary.

Fig. 8 shows a method in use where a garage is supplied after heating the residence; the garage service is shown and marked R, the same being cut in the return pipe only, and for control a by-pass S with three valves is installed; by this method the garage is fed when wanted and otherwise cut out; when garage is on, regulator H is opened for larger feed and good results are found to be the case.

Fig. 9 shows the standard two-pipe pressure gravity system which is locally called "double belt" and is the system most generally used now; it gives perfect results, is low in friction and balances up with no drawbacks; it is very sensitive, though, and any trap in radiator branches is fatal to



FIGS. 7, 8 AND 11. FIG. 7 (at top) SERIES COIL PRESSURE HEATING SYSTEM. FIG. 8 (small cut at left) CONNECTION OF GARAGE SERVICE TO THE HOUSE SERVICE. FIG. 11 (at right) SINGLE SERIES, SINGLE PIPE PRESSURE OR FORCED FEED SYSTEM

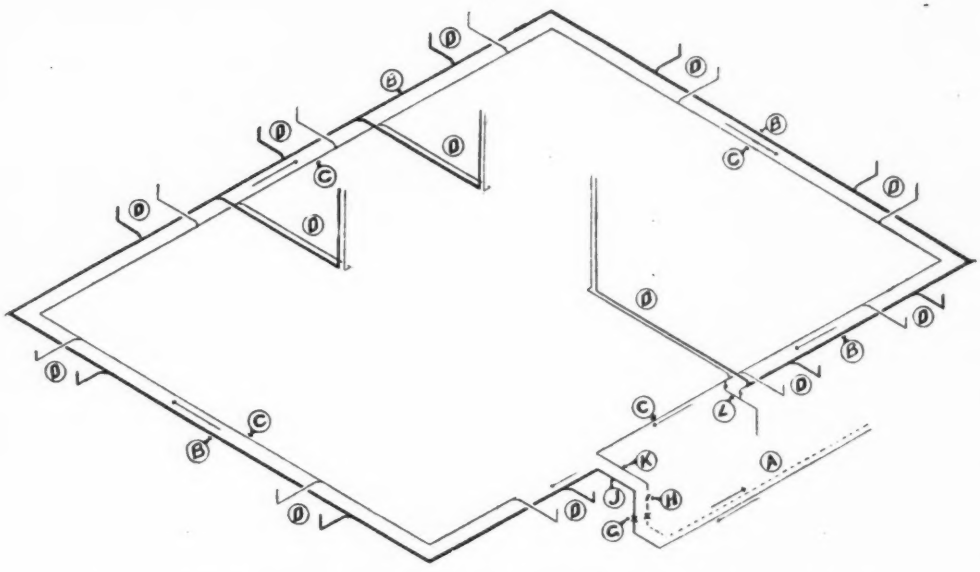


FIG. 9—ONE-BELT, TWO-PIPE, UNDERFEED PRESSURE GRAVITY SYSTEM

that radiator. This belt on, say, 20 ft. by 30 ft., can supply 1200 sq. ft. of radiation on 1½ in. belt with ample results; larger belts are made in 2-in. and 2½-in. pipe sizes.

Fig. 10 shows the same system for locations where the radiators are located in a narrow zone; it is a three-pipe belt and gives results that are all that is expected; for double flat buildings this is specific.

Fig. 11 shows a system installed in a garage which is a series pipe job with radiators and coils both; a radiator located on floor above is shown; the front of garage having large doors and also a side door with cement floor causes the belt to be carried over the openings; traps are thus formed, and, while not detrimental to heating with this job, yet for safety when shut off drips are placed on all low points.

In conclusion, I want to again mention the sensitiveness of all hot water pressure heating work. The best results are demanded of all district heating companies, and, again, reliability, simplicity and, above all, economy are expected of the engineering department of the company.

Two other systems will be mentioned only as this paper has probably exceeded its bounds: both are what is termed overfeed—that is, the feed is carried to the top of building and fed downward—the return being in basement. The runs of the mains are similar but the branches for radiators are different; in the first a single-pipe making a vertical series is used, in which all radiators on that branch are in series and radiation must be figured for same; in the other the rad-

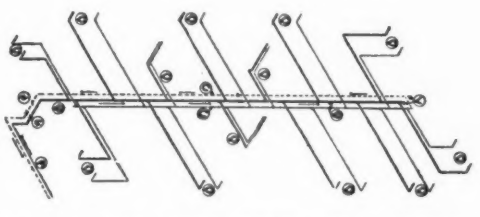


FIG. 10—ONE-BELT, THREE-PIPE, UNDERFEED PRESSURE GRAVITY SYSTEM

iator branches are fed in multiple and the feed supplies all radiators, while a separate return pipe carries the cooled water from the radiators. Both can be used on pressure work, but the writer would strongly urge the last system for both gravity and pressure work. These overhead systems are recommended for buildings of more than three stories high and where attic room can accommodate the main.

New Scheme of Automatic Car Ventilation

An arrangement that may be used for ventilating enclosed buildings, but which is especially designed for street cars and railroad coaches, has lately been patented by Harry B. Leeming, of Salford, England.

The main features of the system are shown in the accompanying drawings. Use is made of a series of open sheet-metal or other cones of varying sizes arranged in line, the small end of one cone projecting into the larger, open end of the succeeding cone, and so on throughout the series. The intention is that a strong current shall be induced down the first cone and delivered at the smaller end into the larger end or mouth of the second cone, and thereby cause vitiated or foul air to enter the larger, open mouth of the second and succeeding cones, and so be swept on through the second cone, on to the third, and so on throughout the series.

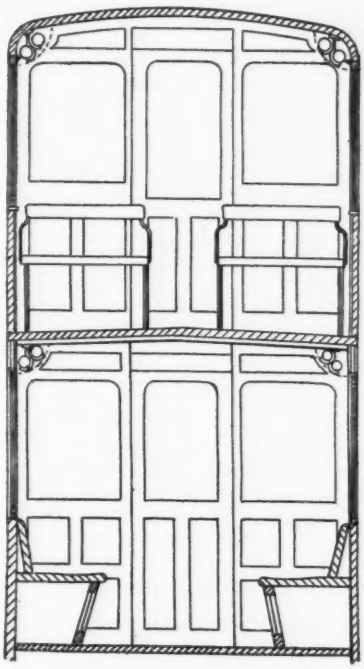


FIG. 3—SECTIONAL ELEVATION OF A DOUBLE-DECK TRAM CAR, WITH THE VENTILATING CONES APPLIED

A number of cones are strung together, or suitably supported, and, according to the essential novel feature of the invention, these are cut from one continuous conical tube, or to corresponding proportions. The conical sections so obtained from one continuous cone length are strung together and annular apertures are provided at regular or suitable intervals through which the vitiated air can enter and be swept along by the induced current traversing from end to end.

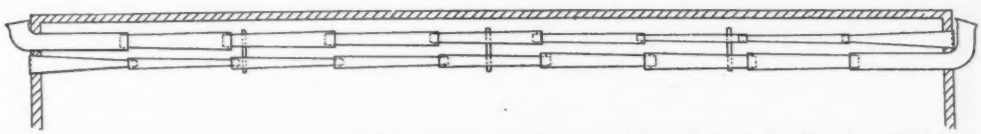


FIG. 1—SECTIONAL PLAN, SHOWING APPLICATION OF A SERIES OF CONES TO THE VENTILATION OF A STREET CAR

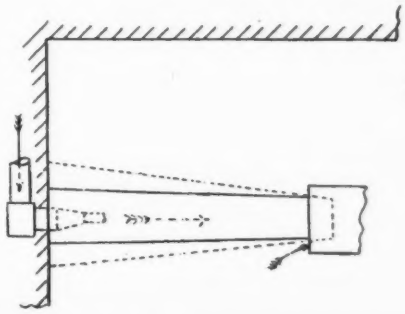


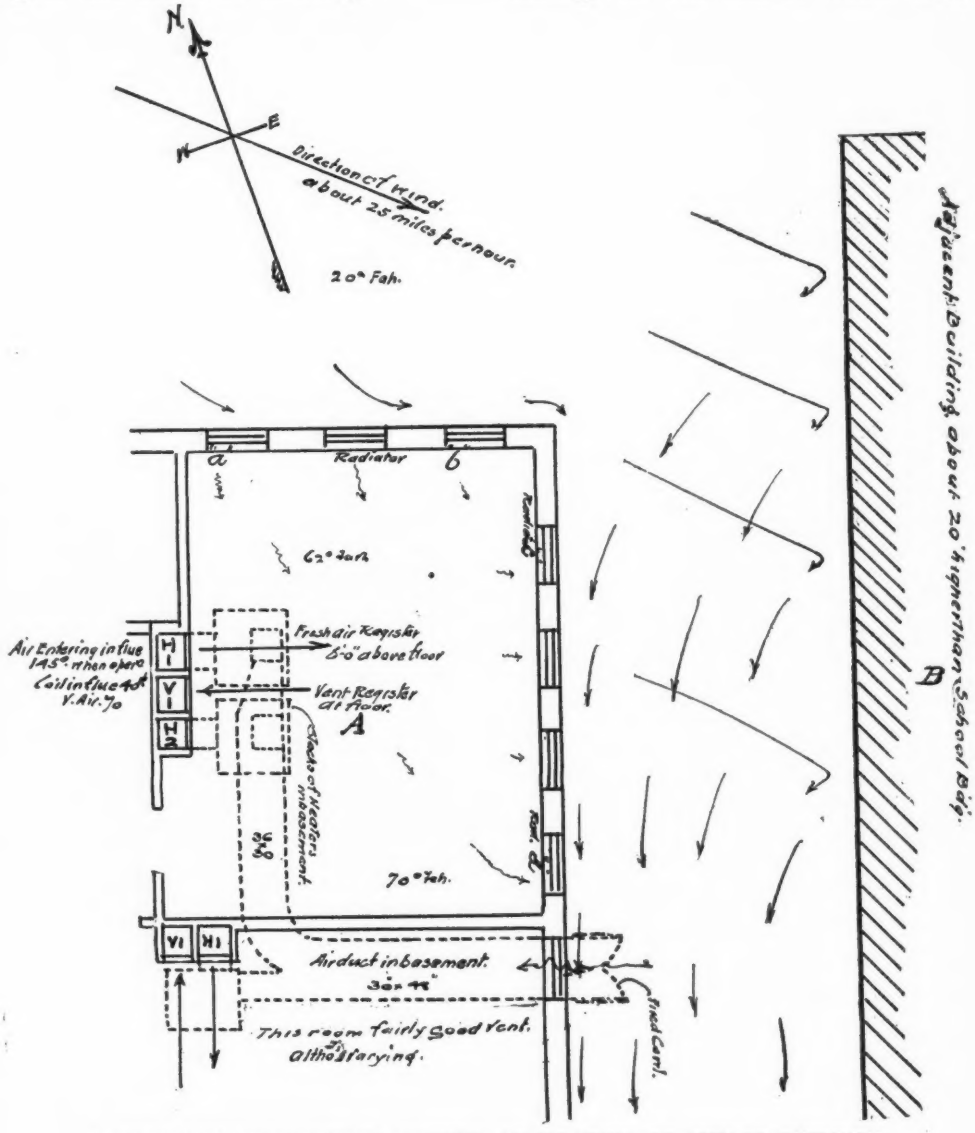
FIG. 2—VENTILATING CONES EQUIPPED WITH A NOZZLE OR BLOWING DEVICE

The scheme, as described, may be modified to suit various conditions. A fan, for instance, may be located at the exit to accelerate the flow of air. A nozzle or blowing device may also be utilized, as shown in Fig. 2, which would probably prove an advantage when the cones are fixed in a building.

In Fig. 3 the illustration shows two sets of a series of cones longitudinally disposed on each side of a tram-car, but any required number may be used, and they could, if desired, be located in air trunks in the car roof.

Wind Effects on Heating of Buildings

The accompanying sketch is intended to represent a school building, A, and its immediate surroundings. The adjacent building, B, is in the position shown. Fresh air inlets for the air supply, and exhaust outlets for the ventilation are as indicated. The adjacent building is about 20 ft. higher and about 20 ft. away.



SKETCH SHOWING EFFECT OF WIND ON HEATING OF SCHOOL BUILDING

When the wind was blowing from the northwest, I found that I could get very little air in the room, A, through the register. The wind would strike the adjacent building and follow the lines shown by the arrows, causing the air to vary in the fresh air registers, so that instead of a steady inflow at the register, there would be an outflow at times; that is, I could get a varying amount from nothing to 300 ft. velocity, and then suddenly reversing, so that my readings for one minute would show that there was no air registered.

I placed a temporary wind shield over the fresh air intake, and this I found corrected the difficulty. I then erected a permanent shield.

The room had three windows on the north side, and four windows on the east side. Placing my anemometer on the windowsill at a, I found there was an appreciable inflow through the closed window, caused by window leakage. Placing it at b, I found there was an inflow and outflow, also due to leakage. Testing at c, there seemed considerable leakage, and at d considerable outflow; these acted as a check on the inlet from the fresh air register.

Opening the window at a, of sufficient area to equal the size of heat flue or register, there was a positive inflow through this opening, and slightly less volume in the outflow in the vent register. Closing this window, and removing my anemometer to the window d and opening the same in proportion to the vent register, there was an outflow, and the vent register was found to be dead, as no air was passing through.

The effect was caused by the high wind striking the taller adjoining building, depressing the current, and sweeping through the space between the two buildings with rapid velocity in the lines shown by the arrows, causing a suction on the east side of the school building, which drew the air through the space around the sash at c and d sufficient to prevent the proper operation in the heat and vent flues. Placing the cowl over the intake to the fresh air flue assisted in supplying the air to the room independent of what leaked in and out through the sash. If the windows had been properly weather stripped there would have been less trouble with the inlet and vent outlet flues. —*Thomas Barwick, before the American Society of Heating and Ventilating Engineers.*

Ventilation and Heating of Public Buildings in 1859

The practice of heating and ventilation as it existed in 1859 is reported in a curious clipping from a New York newspaper which has come to light, reporting a lecture on the subject delivered by a Dr. Watson, in that year, at the New York Hospital. In this lecture Dr. Watson recounted to the large number of the medical profession and medical students who were present, the new ventilating apparatus, which was then under construction at the hospital, in connection with a new steam heating system.

"Two perpendicular shafts," he said, "each about 15 ft. high and 4½ ft. wide, internally, are in the open green at the north—the other, in the corresponding green at the south of the building, each at a distance of 30 ft. from it, having been erected and made to communicate beneath, with the underground air ducts of the same capacity, passing in a direct line onward from the upright shaft towards the center of the basement hall, and beneath it to within a few feet of the points at which the respective wings meet the central portion of the buildings. Each of these underground air-ducts, in its passage underneath the hall, gives off four laterally ascending branches, which open into a corresponding number of air chambers in the basement wings, the united capacity of the ascending branches being still equal to that of the main air duct, and both of them opening into its respective air chamber through the floor.

"In supplying pure air to the center of the house, three apparatuses are provided near the basement windows, one on either side of the front entrance, and one at the corresponding point in the rear. The air is introduced through them in such a way as to become somewhat tempered before reaching the three air chambers in the basement under the center part of the house, into which they open near the floor. From the eleven air chambers, four for each wing and three for the center, the air is conducted upward by ascending flues, all terminating near the floor of the respective apartments to which they lead, and retaining the united capacity equal to that of the external openings."

NATIONAL ASSOCIATION OF MASTER STEAM AND HOT WATER FITTERS

WHO HELPS ME I HELP

Twenty-Third Annual Convention, Chicago, May 29-June 1, 1911

A notable and successful convention properly describes the twenty-third annual meeting of the National Association of Master Steam and Hot Water Fitters in Chicago, May 29-June 1, 1911. While the direct object of its coming to Chicago—namely, the affiliation of the Chicago master fitters with the National organization—was not realized, the gathering of so large a number of master fitters and members of the supply trade as were present and the scale on which the entertainment and other features were carried out mark the convention as one of the most important in the history of the association.

Through its three local associations of steam and hot water fitting contractors, Chicago materially swelled the attendance of the contractors. The Chicago Master Steam and Hot Water Fitters, the most important of the local bodies, had temporary headquarters in the Sherman Hotel, where the convention was held, and on behalf of all three local associations constituted itself as a Committee of Welcome. It was early made evident, however, that the desire, under present conditions, for an independent organization in Chicago was so overwhelming as to preclude all thought of union with the National body. The reasons, moreover, were frankly given as being largely due to the centering of the association's activities in the East, both in its general policy and in its details of organizaton.

Outside of the presence of so many Chicago master fitters, one of the most important contributing features to the success of the convention were the luxurious appointments of the hotel itself. A commodious banquet hall on the third floor was reserved for the regular sessions, while a hall immediately in the rear was utilized for the repast served by the Manufacturers' and Salesmen's Committee on the second night of the convention. Every convenience was at the disposal of the visiting members and guests, and added much to the general enjoyment.

In response to special invitations, many of the former presidents were on hand to participate in a reunion of the charter members and past-presidents. This feature of the convention was emphasized on account of the fact that the organization held its first meeting in Chicago in 1889. As many as possible of those whose faces appeared in the first convention photograph were invited to be present, and during the open session a photograph was made of the "old guard." In this connection Secretary Gombers read an interesting letter from Walter Higgins, of Washington, D. C., expressing his regret at not being able to be present. He was eighty-six years old on May 28.

Following various committee meetings, on Monday, May 29, the convention formally opened with an executive session Tuesday morning, May 30, held to perfect the convention details.

In the afternoon the convention met in open session, with President Charles A. Geoghegan in the chair. The Committee on Credentials, Alfred E. Kenrick, chairman, reported that 374 members were qualified to sit in the convention. In addition to the Credential Committee, other committee announcements were as follows:

COMMITTEES

NOMINATING—S. A. Jellett, Pennsylvania; A. E. Kenrick, Massachusetts; L. W.

CONVENTION PHOTOGRAPH, NATIONAL ASSOCIATION OF MASTER STEAM AND HOT WATER FITTERS, CHICAGO, MAY 29-JUNE 1, 1911

Butterfield, New Jersey; A. E. Werkhoff, Indiana; Chas. J. Weibert, New York.

CONSTITUTION AND BY-LAWS—P. Gormly, Pennsylvania; W. C. Weatherly, Michigan; G. F. Kappel, New Jersey; U. G. Scollay, New York.

WAYS AND MEANS AND GOOD OF THE ORDER—E. B. Denny, New Jersey; J. T. Bradley, Missouri; D. A. Farrell, Georgia.

APPEALS AND GRIEVANCES—E. Grassler, Wisconsin; I. E. Shaw, Illinois; H. P. Cahill, Ohio.

AUDITING—W. J. Baldwin, Jr., New York; W. A. Lawson, New Jersey; W. H. Curtin, New York.

DISTRIBUTION OF REPORTS—W. M. Whitlock, New Jersey; George Suter, Missouri; G. H. Drake, New York.

President Geoghegan then read his address. He alluded to the fact that at the first convention of Master Fitters' Association the late Charles J. Gillis, who was Mr. Geoghegan's partner, was elected president of the Master Steam and Hot Water Fitters' Association of the United States. He also stated that the firm of which Mr. Gillis was partner—namely, Gillis & Geoghegan—has been a member of the association continuously since its organization, a period covering twenty-three years.

"The National association," continued Mr. Geoghegan, "was organized for the purpose of protecting our business against unscrupulous manufacturers who were interfering with the whole craft. Another object was the advancement of the trade in all the latest discoveries of science appertaining to the circulation of steam and hot water, and the several branches of ventilating, and to create a better feeling among all master fitters. And I can say, without fear of contradiction, that the National association has succeeded beyond its expectations up to the present day."

"Gentlemen," added Mr. Geoghegan, "let me tell you, when a name of a manufacturer has been removed from our List in Accord, all sorts of pressure are brought to bear to have it replaced, and it is replaced when the erring one gives his assurance that he will deal honestly in the future with our members."

After referring to the previous work of the association in securing the adoption of a schedule of standard flanges, in accordance with which all manufacturers now make flanges of uniform diameter and thickness, with uniform number, size and position of bolt holes, President Geoghegan continued, "Our Committee on Standardization, after five years' investigation and labor, has worked out a schedule for flanged fittings, both standard and extra heavy, and a committee of the American Society of Mechanical Engineers has coincided with our views thereon. The schedule also meets with the approval of a representative of the United States Navy Department (Commander Charles M. Dyson), who was in joint session with the committee when the schedule was finally passed upon."

A pamphlet containing the committee's recommendations on this subject was distributed at the convention.

"A number of manufacturers have already agreed to accept the schedule, so that we can safely say another milestone in the march of progress has been reached."

Of the other activities of the association Mr. Geoghegan said: "Our Committee on Standardization is working at the present time with the boiler manufacturers to try to have them properly rate their house-heating boilers, so that when you want to order a boiler that manufacturers claim will supply 100 sq. ft. of radiation, you can take their catalogues, look at the rating printed therein and know that the boiler will do exactly what they claim, and save you the annoyance and time turning from page to page to find out what the several conditions are.

"This National association," concluded Mr. Geoghegan, "made a very careful and thorough examination of the patents of the several vacuum heating systems and found that almost all of the so-called patents had expired; and to-day the members of the Master Fitters' Association throughout the country can install a vacuum heating system without paying royal-

ties to anybody. We had no desire to interfere with the business of any reputable manufacturer or dealer placing on the market any patented article, or improved method of installing any kind of heating, ventilating or power plants, such as our members are interested in, but we did intend to put a stop to the unfair and unjust demands made upon our members and threats conveyed to our customers by those who thought their business interests were best served by following such methods."

REPORT OF BOARD OF DIRECTORS

The Board of Directors, in its report, referred to the vacuum heating patents situation by stating:

"The subject of vacuum heating systems, which required so much attention during the years 1909-1910, was so effectually treated that its ghost seems to have been laid. We have no complaints in this line from members, and know of no case where members have been disturbed by threats or lawsuits when the suggestions of our printed reports were followed."

The board reported that the matter of a change in the association's "Trade Resolutions" had been under consideration as a result of discussion at the last convention, and that after conferences with several manufacturers a proposed alteration in the "Trade Resolutions" was prepared which would be presented in executive session.

The board's report also stated that in the matter of rating house-heating boilers the most difficult questions have been carefully considered, and that, as a result of many conferences with manufacturers, conclusions had been reached which will soon result in such ratings for house-heating boilers as well surely commend the work of the Standardization Committee to every master steam fitter.

In the expectation that some action would be taken on the subject of boiler ratings, a large representation of boiler manufacturers was on hand at the Wednesday morning session, May 31, but the matter was referred back to the committee.

The report concluded with an earnest invitation to the Chicago master fitters, and to other non-members, to become affiliated with the National association. The report was signed by Edward B. Denny (chairman), J. A. Almirall, N. P. Bishop, John T. Bradley, Charles A. Geoghegan, P. F. Maginn, William H. Oakes and John T. Sadler.

STANDARD UNIFORM FLANGED FITTINGS

N. Loring Danforth, for the Committee on Standardization, presented a detailed report of the committee's work, which stated:

"A few years ago the possibility of standardizing fittings so that all makes would be uniform in every essential detail was hardly thought of; it looked so improbable a task. To-day we can safely say that within the next six months manufacturers will be making standard uniform flanged fittings, provided the members of this association will back up what your Board of Directors and Standardization Committee, together with a committee of the American Society of Mechanical Engineers have adopted, and will shortly present to the manufacturers as the standard. If only a few manufacturers accept it at first these are the ones we want to stand by and show them we appreciate their desire to do what everyone recognizes as a necessity in bettering trade conditions. Our members should feel proud to know that our association took the initiative in this important engineering problem, and that we are recognized as an association of able contracting engineers who want to work with other National engineering societies in bringing this branch of engineering to as high a point of perfection as possible.

"A great deal of credit is due to Mr. William T. English, of our committee, who has devoted a considerable amount of time to compiling the lists and arranging the detail drawings of the fittings, all of which were made in his office, under his personal supervision, and which took months to complete. As we all know, at the present time flanged fittings made by many different manufacturers nearly all vary in some dimensions, so that if a fitting

breaks, or if for any reason we must change a fitting in a main, it necessitates getting a new fitting from the same pattern as the old one, and if this cannot be done it may be necessary to change a length of pipe, which often requires a great amount of time and labor. This question not only affects us as contractors, but often the owner suffers where his plant is shut down for hours or days waiting for repairs which could be made very quickly if the fittings were of standard dimensions.

RATING HOUSE-HEATING BOILERS

"In the matter of arriving at a standard for rating house-heating boilers, we have made less progress than we hoped to. We have, however, made some definite progress which we think will show results in the near future. By continually agitating the subject, we have been able to get the engineers, manufacturers, and even some of the architects interested, and they all see the necessity for some uniform method of testing and a proper basis for rating boilers used for house-heating purposes. We know that some manufacturers are now making tests along lines which we have outlined as house-heating conditions, and when the results of these tests have been compiled it will be possible for them to give conservative ratings, which for house-heating conditions should be generally satisfactory. Our committee has made some tests at one of the large boiler manufacturer's plants, and has gathered from many members of the association the results of their individual experiences, and we have tried to compile in a fair way, and as concisely as possible, what we consider to be actual house-heating conditions.

"Manufacturers should be able to guarantee their boilers under these conditions, and rate them accordingly. If the boiler manufacturers will not rate their boilers under house-heating conditions, we will at least try to get from them the results of their tests made under these conditions, and from the data we receive we may be able to give the members information so they can determine for themselves, more accurately than now, what ratings different boilers should have under house-heating conditions.

"This subject is an important one, and the committee would like to hear from members who have information which they are willing we should have, and the more information we get from members, even if it is only their unfortunate experiences with different boilers, will materially help the committee when meeting the manufacturers and trying to get them to see this subject as we do, as contractors.

"The members of this association can do more in the matter of getting proper ratings for house-heating boilers than any committee can. The committee can formulate conditions as nearly right as possible and can ask the manufacturers to comply with these conditions; but where manufacturers think it may be detrimental to their interests to give us boiler ratings such as we ask them, we must stand firm and demand fairness and recognize substantially those manufacturers who are fair. We have asked some of the manufacturers to consider the question of giving us ratings on all house-heating boilers in accordance with the amount of coal burned per hour per square foot of grate, when the boiler is fired at stated periods. We hope in this way to be able to tell at a glance what a boiler will do under different conditions of firings and amounts of coal burned. In fixing the amount of coal to be burned and the periods of firing, we have had to take the experience of those who have given us their experience. You can see how important and necessary it is for members to take a personal interest in accumulating data on subjects pertaining to this branch of engineering and letting our committee have the benefit of your experience."

The report was signed by Wm. J. Baldwin, Jr. (chairman), N. Loring Danforth, Wm. P. Kirk, Edward B. Denny and Charles A. Geoghegan.

BIDDING FOR WORK THROUGH GENERAL CONTRACTORS

The Committee on Trade Relations devoted its report, which was read by

E. B. Denny, chairman, to a discussion of the practice of sub-contracting on the part of master fitters. Following are the principal portions of the report:

"This subject has been agitated for some years, and, as a result, much of the important work in our business is let separately, and many of our best concerns refrain almost entirely from sub-contracting. Still, much important work is done through general contractors, and most of it without ultimate profit to the sub-contractors. Why should the practice continue; or why should otherwise sane business men continue a practice which is admitted to be ultimately ruinous? Is it not in a measure because no practical means are in their hands by which much of it could be avoided and the practice discredited? We believe that much business now done in this unprofitable way could be secured direct if plain but adequate reasons for the change could be presented at the proper time and in concrete form. We therefore recommend that such reasons as we suggest below be printed and in the hands of our members, for use as occasion or opportunity arises:

"1. Why should a broker or general contractor, who has no expert knowledge of such work, intervene at the expense of the owner either in money or character of plant installed?

"2. The minimum of risk assumed is admitted to be the best business practice.

"3. Direct contracting with the owner means the minimum risk in most cases.

"4. Accepting the broker or general contractor, in lieu of the owner, is increasing business risk, with no adequate return, and is not good business practice.

"5. Dealings through general contractors mean that the sub-contractor's capital is often used to carry on the general contractor's business. This is a form of philanthropy, and not of business.

"6. Where it is necessary that the work be done under a general contract, we recommend that bids be submitted to, and be opened by, the owner or his direct representative, and the contract be awarded to the acceptable bidder, who may then have his figures incorporated in the general contract."

The report was signed by E. D. Denny (chairman), J. P. Gallivan, C. A. Geoghegan, F. P. Hill, H. Middleton, S. Wright and G. F. Kirkhoff.

The secretary's and treasurer's reports were then presented, the treasurer's report showing:

Cash on hand May 1, 1910.	$8,622.61
Receipts, May 1, 1910, to May 1, 1911	14,652.03
Making a total of....	$23,274.64
Expended, May 1, 1910, to May 1, 1911.....	15,209.28
Cash balance May 1, 1911.	$8,065.36

The report was signed by J. A. Almirall, treasurer.

PENNSYLVANIA STATE ASSOCIATION ON SUB-CONTRACTING

The Pennsylvania State Association presented the following resolutions, which were unanimously adopted at its convention in Pittsburg, May 28, with a request for their consideration by the National association. They were referred to the incoming Board of Directors:

"1. Resolved, as it is the sense of this association that the heating apparatus is a part of the finishing of a building, we recommend that the practice of bidding to general contractors be discontinued, and in lieu thereof bids be tendered to the owner or his representative.

"2. Resolved, that we consider charges for boxing and crating material as unfair and unjust extra charges; are therefore opposed to it, and recommend some action on the part of the National association to have the practice discontinued.

"3. Resolved, as the sense of this association that boiler manufacturers making sales of boilers, radiators and repairs, etc., direct to consumers cannot expect to be retained on our accord list.

"4. The convention directed that

membership committees representing various districts of the state be appointed to canvass and solicit members; and in this connection request the National association to assist in our efforts to increase the membership by sending an organizer through the state of Pennsylvania."

The first session on Wednesday morning, May 31, was behind closed doors. In the afternoon, at an open session, new officers were elected and installed, the past presidents and charter members present were photographed in a body, and a special address was delivered by Richard T. Crane, president of the Crane Co., Chicago. A paper by Edward P. Bates, of Syracuse, N. Y., was read by Secretary Gombers.

New Officers

The new officers elected were as follows:

PRESIDENT

Edward B. Denny, Newark, N. J.

VICE-PRESIDENT

John T. Bradley, St. Louis, Mo.

TREASURER

J. A. Almirall, New York.

BOARD OF DIRECTORS

Charles A. Geoghegan, New York; P. F. Maginn, Pittsburg; William H. Oakes, Boston; G. F. Kirkhoff, Indianapolis; Samuel Wright, Buffalo.

The Entertainment Features

Under the supervision of President William G. Le Compte, of the Manufacturers' and Supply Men's Entertainment Committee, a programme of entertainment for the delegates and ladies and other guests was carried out in a manner that brought forth the heartiest expressions of praise. The enjoyment of the various outings was enhanced by the beautiful weather which prevailed throughout the convention.

Immediately after the opening session a meeting of the committee was held, with President Le Compte in the chair. A. S. Armagnac was made temporary secretary and Joseph Graham, temporary treasurer.

A committee on rifle range was appointed, consisting of Emmons Collins, A. M. Nichols and F. E. Whiting; also a committee on bowling alleys, composed of P. H. Pinder, A. S. Armagnac and C. A. Miller.

Before adjournment the meeting re-elected William G. Le Compte president; Frank K. Chew, secretary, and M. E. Danforth, treasurer.

The following firms responded to the invitation to share in the expenses incident to the entertainment as planned:

H. B. Smith Co., Westfield, Mass.
Jenkins Bros., New York.
Warren Webster & Co., Camden, N. J.
Bishop-Babcock-Becker Co., Cleveland, O.
H. W. Johns-Manville Co., New York.
Powers Regulator Co., Chicago.
Standard Steam Specialty Co., New York.
United States Radiator Corporation, Detroit, Mich.
Iroquois Engineering Co., Chicago.
American Radiator Co., Chicago.
C. A. Dunham Co., Marshalltown, Ia.

MASTER FITTERS WIN RIFLE MATCH

The first event on the programme was a rifle match, Tuesday evening, May 30, at Free's Rifle Gallery, between the Master Fitters and the supply men. This match resulted as follows:

MASTER FITTERS

Name.	Score.
William J. Baldwin, Jr.	473
P. F. Maginn	464
John T. Sadler	441
J. A. Almirall	471
H. B. Gombers	459
Total	2308

SUPPLY MEN

William G. Le Compte	481
R. B. Flershem	458
Edward E. McNair	452
Frank B. Howell	471
Theo. F. Humphreys	387
Total	2249

The two men on each side having the highest scores continued the match with the following results:

MASTER FITTERS

Name.	Score.
William J. Baldwin, Jr.	479
J. A. Almirall	470
Total	949

SUPPLY MEN

William G. Le Compte	473
Frank B. Howell	466
Total	939

THE BOWLING MATCHES

The Master Fitters were also successful in the bowling match Wednesday evening against the supply men. The result of this match is shown herewith:

SUPPLY MEN

	1st G.	2d G.	3d G.
C. A. Miller.....	131	163	102
H. B. McLelland...	126	188	168
L. H. Drury.....	113	135	120
A. M. Nichol.....	75	130	112
J. T. Stackhouse...	141	136	140
Totals.....	586	752	642

MASTER FITTERS

G. H. Zellers.....	121	188	104
E. F. Joy	119	167	190
H. W. Chapman...	155	127	178
H. B. Gombers....	132	100	116
W. J. Baldwin, Jr..	149	129	132
Totals.....	676	711	720

Fifteen ladies participated in the ladies' bowling match, with the following results, the ten prize winners being given in the order named:

LADIES' BOWLING SCORES

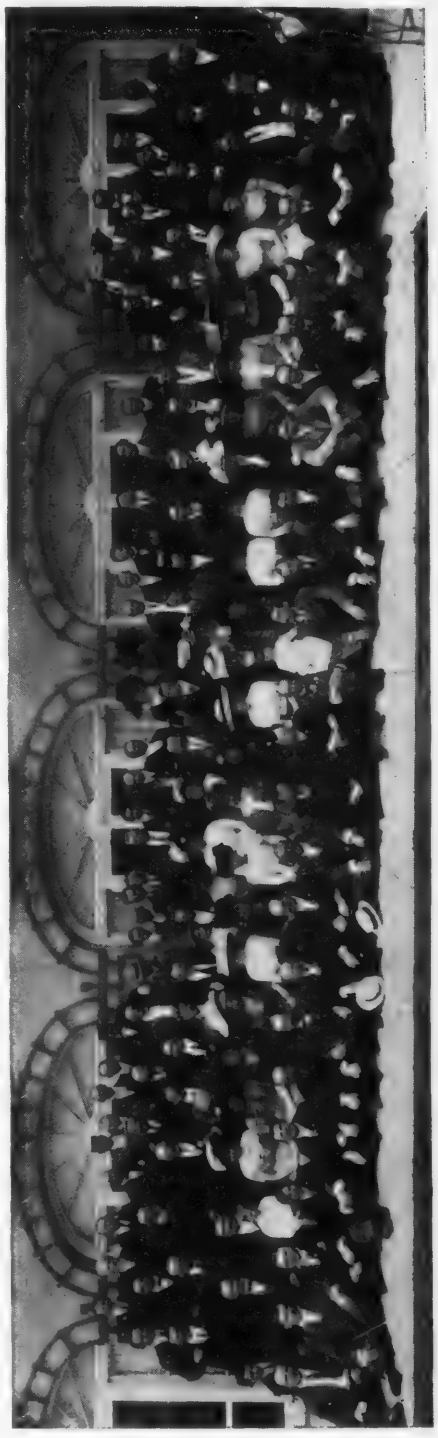
Miss B. W. Zellers, Washington D. C.	131
Mrs. P. H. Pinder, New York.....	120
Miss N. E. Zellers, Washington, D. C.	112
Mrs. W. J. Woolley, Evansville, Ind.	97
Mrs. H. W. Chapman, New York....	89
Mrs. N. P. Bishop, New Haven, Conn.	79
Mrs. J. T. Bradley, St. Louis.....	69
Mrs. C. A. Geoghegan, New York...	67
Mrs. J. A. Ziesse, Grand Rapids, Mich.	64
Mrs. H. B. McLelland, Chicago.....	58
Mrs. Frank Leavery, Syracuse, N. Y.	58
Mrs. H. B. Gombers, New York.....	53
Mrs. J. S. Knee.....	50
Miss M. Birge, New York.....	44
Mrs. G. H. Zellers, Washington, D. C.	34

Immediately following the completion of the bowling matches, the entire party repaired to one of the banquet halls of the Hotel Sherman, where a midnight supper was served, consisting of lobster and chicken salads, ice cream, coffee and cigars; also sauterne and champagne.

The banquet hall presented a pretty sight as the eighty-three diners sat down at practically one table, which extended along three sides of the apartment. Here the prizes for both the rifle match and bowling tournament were presented.

Mr. Le Compte, as president of the Entertainment Committee, acted as toastmaster and filled the rôle with marked success. His first act was to appoint John T. Bradley, the new vice-president of the Master Fitters' Association, as sergeant-at-arms to see that the prizes reached the right hands. Mr. Le Compte then named John C. F. Trachsel and Elias D. Smith as escorts to the prize winners, the prizes being displayed on a table in the center of the room, each winner taking his or her choice, in order.

The efforts of the escorts to be first in reaching the prize winners as their names



GROUP OF CONVENTION GUESTS AT THE SOUTH SHORE COUNTRY CLUB, CHICAGO

were announced, brought forth screams of laughter and were only equaled by the persistent attempts of Mr. Bradley to foist a certain green parasol upon each lady as she arrived to make her selection.

So swiftly and delightfully was the time passed that it was in the "wee sma' hours' before the company broke up, a fact that was brought to the attention of the diners by Mr. Gormly who, in a few informal remarks, said he was not accustomed to make "after-breakfast" speeches.

Before breaking up, however, a vote of thanks was passed to the manufacturers and supply men for the hospitality. An anticipatory vote of thanks was also tendered to the American Radiator Company for the plans that had been made to entertain the convention on the following day.

AUTOMOBILE RIDE AND LUNCHEON AT THE SOUTH SHORE COUNTRY CLUB

A fitting climax to the pleasures of the convention was the outing for the members and guests of the association, which was planned and carried out by the American Radiator Company.

Immediately after the final adjournment of the convention on Thursday morning, June 1, automobiles were in waiting and the entire company was taken on a charming ride down Michigan avenue, and then through Washington and Jackson Parks to the South Shore Country Club.

Perfect weather conditions made the trip an ideal one. Arriving at the handsomely-appointed clubhouse the party, after a few minutes' rest, sat down to a daintily prepared luncheon in a dining room directly facing Lake Michigan, whose green and blue water danced like champagne in the sunlight.

The arrangements made through Chas. K. Foster, vice-president and general manager of sales of the American Radiator Company, were perfect to the last detail and a toast proposed during the luncheon to Mr. Foster was drunk standing. Another toast to the new president of the National Association of Master Steam and Hot Water Fitters, E. B. Denny, was drunk with equal enthusiasm.

After a delightful stroll on the club lawns, during which a group photograph was taken, the party was carried back to the city along the lake front and through typical residential sections.

MEMBERS AND GUESTS

Edward B. Denny, Newark, N. J.
Charles A. Geoghegan, New York.
J. A. Almirall, New York.
H. B. Gombers, New York.
John C. F. Trachsel, Philadelphia, Pa.
M. G. Sellers, Philadelphia, Pa.
George H. Kirkhoff, Indianapolis, Ind.
J. T. Bradley, St. Louis, Mo.
Stewart A. Jellett, Philadelphia, Pa.
N. L. Danforth, Buffalo, N. Y.
W. J. Baldwin, Jr., New York.
T. B. Cryer, Newark, N. J.
E. F. Capron, Chicago, Ill.
J. T. Sadler, Elmira, N. Y.
C. H. Simmons, Chicago, Ill.
E. A. Cleland, Lynchburg, Va.
W. S. Patterson, Appleton, Wis.
T. J. Douglass, Chicago, Ill.
F. W. Lamb, Chicago, Ill.
A. W. Michel, Detroit, Mich.
H. Middleton, Baltimore, Md.
W. P. Kirk, Bridgeport, Conn.
I. E. Shaw, Gardner, Ill.
E. Hasey, Milwaukee, Wis.
W. Dougherty, Syracuse, N. Y.
George H. Drake, Buffalo, N. Y.
Samuel Wright, Buffalo, N. Y.
B. W. Brady, Chicago, Ill.
J. J. Collins, St. Louis, Mo.
C. E. Hasey, Minneapolis, Minn.
George Suter, Sedalia, Mo.
H. W. Chapman, New York.
P. Gormly, Philadelphia, Pa.
W. J. Olvaney, New York.
U. G. Scollay, Brooklyn, N. Y.
C. J. Wiebert, Brooklyn, N. Y.
A. B. Weaver, Buffalo, N. Y.
P. T. Maginn, Pittsburg, Pa.
G. H. Zellers, Washington, D. C.
W. P. Thompson, Pittsburg, Pa.
L. C. Rhoades, Rennselaer, Ind.
William Schober, Park Ridge, Ill.
Alfred E. Kenrick, Brookline, Mass.
W. H. Curtin, Brooklyn, N. Y.
W. J. O'Brien, Brooklyn, N. Y.
D. A. Farrell, Atlanta, Ga.
Frank Traver, Syracuse, N. Y.
W. B. Graves, Chicago, Ill.
Herman Appel, Sandusky, O.
L. W. Butterfield, Orange, N. J.
A. Dauch, Cincinnati, O.
Walter A. Lawson, Newark, N. J.
William Woolley, Evansville, Ind.
Robert Ernst, Detroit, Mich.
Joseph A. Langdon, Pittsburg, Pa.
John O'Donnell, Evansville, Ind.
Edward F. Joy, Syracuse, N. Y.
E. R. Steinmetz, Philadelphia, Pa.
H. P. Cahill, Akron, O.
H. L. Brown, Cassopolis, Wis.
C. J. Fox, Milwaukee, Wis.
Otto Biefield, Watertown, Wis.
Rud. Zuehlke, Milwaukee, Wis.
J. A. Ziesse, Grand Rapids, Mich.
J. A. Diggle, Indianapolis, Ind.
A. E. Werkhoff, Lafayette, Ind.
W. C. Weatherly, Grand Rapids, Mich.
W. H. Powell, Anderson, Ind.
J. S. Knee, Grand Rapids, Mich.
W. M. Whitlock, Newark, N. J.
R. C. Faunt, Milwaukee, Wis.
E. Grassler, Milwaukee, Wis.
J. F. Garvey, Mason City, Ia.
M. H. Markey, Lewisburg, O.
C. S. Thompson, Atlantic City, N. J.
N. L. Gaskell, Atlantic City, N. J.
I. E. Shaw, Gardner, Ill.
Edward Kanney, Laporte, Ind.
S. A. Schmitt, Evansville, Ind.
W. C. Wright, Chicago, Ill.
A. J. Stuebel, Milwaukee, Wis.
P. H. Kendricken, Boston, Mass.
E. Tunstead, Minneapolis, Minn.
H. W. Tuttle.
J. H. Cook, Chicago, Ill.
James I. Pope, Chicago, Ill.
M. E. Flaherty, Milwaukee, Wis.
N. E. Füst, Chicago, Ill.
George M. Getshow, Chicago, Ill.
E. D. Smith, Elizabeth, N. J.
E. N. Murphy.
G. F. Kappel, Camden, N. J.
William A. Pope, Chicago, Ill.
George H. Reynolds, Chicago, Ill.
W. A. Mertz, Chicago, Ill.
W. L. Thompson, Chicago, Ill.
W. M. Lindder, Chicago, Ill.
F. J. McMaster, Chicago, Ill.
E. G. Melum, Chicago, Ill.
J. J. Herlihy, Chicago, Ill.
E. R. Steinmetz, Chicago, Ill.
Charles F. Newport, Chicago, Ill.

Cordez Heat Supply Co., Milwaukee, Wis., R. Cordez, president.

Pressed Radiator Co. of America, Pittsburg, George B. Carr, manager Chicago branch, and Arthur W. Becker, assistant manager.

Suburban Water Supply Co., Chicago, Joseph B. Rider, chief engineer.

Warneke-Derringer Co., Minneapolis, Minn., W. Warneke.
Vapor Heating Co., Philadelphia, J. J. McKenna.
McDonald Vacuum and Vapor Specialty Co., Cleveland, O., J. J. McDonald, manager.
Patterson-Allen Engineering Co., New York, Thomas M. Mayer.
Bishop-Babcock-Becker Co., Cleveland, O., W. S. Ransom, Emmons Collins, George L. Fitz and A. F. Phillippi.
Rapid Calculator Co., Chicago, L. C. Hine and William B. Bostian.
Powers Regulator Co., Chicago, F. W. Powers and A. E. Schad.
Jas. B. Clow & Sons, Chicago, N. E. Frost, manager heating department.
American Blower Co., Detroit, Mich., A. M. Nichol.
Scully Steel and Iron Co., Chicago, H. T. Gielow.
J. H. Williams Co., Brooklyn, C. E. Hathaway.
George M. Newhall Engineering Co., Chicago, James A. Coutts.
P. Watson Specialty Co., Terre Haute, Ind., B. L. Watson.
Western Kieley Steam Specialty Co., Chicago, P. Boyleston, A. E. Heinze and H. J. Richter.
Carson Die and Tool Co., Chicago, F. P. Gillett and J. Fieldhouse.
Crane Co., Chicago, R. T. Crane, president; J. B. Berryman, secretary; J. A. Minwegen, engineering department, and E. P. Cole.
American Radiator Co., Chicago, Charles K. Foster, C. M. Parker, W. H. Hill, Louis Bruch, F. B. Howell, E. J. Holland, R. B. Flershem, D. E. Kennedy, W. M. Scudder, A. K. Root, James H. Davis, F. S. Whitelaw, George D. Hoffman, L. H. Drury and M. J. Beirn, Jr.
United States Radiator Corporation, Detroit, Mich., Frederick W. Herendeen, general manager of sales; J. J. Blackmore, secretary; W. M. Foster, C. A. Barker, J. M. Chapman, Jr., E. E. McNair, Chicago, manager; Joseph Piraux, Jr.
H. W. Johns-Manville Co., New York, J. Roy Andrews.
B. F. Sturtevant Co., Hyde Park, Mass., J. E. Anderson, Jr., Chicago manager.
Automatic Heating Co., Chicago, James E. Heg, Charles E. Warsop and S. F. Brunette.
Kewanee Boiler Co., Kewanee, Ill., J. P. Dugger and A. T. Kellogg.
H. L. E. Petersen, Elgin, Ill., H. L. E. Petersen.
National Steam Specialty Co., Chicago, H. H. Ludwig.
Western Valve Co., Chicago, P. S. Hudson.
S. Wilks Mfg. Co., Chicago, Charles C. Hughes, sales manager.
Standard Sanitary Mfg. Co., Chicago, J. A. Noone, manager Chicago office.
C. A. Dunham Co., Marshalltown, Ia., J. W. Hook, George W. Best, chief engineer.
H. B. Smith Co., Westfield, Mass., Theo. F. Humphreys and Charles A. Miller.
Michigan Pipe Co., Bay City, Mich., Henry B. Smith, Sr.
Walworth Mfg. Co., Boston, George T. Coppins.
International Sprinkler Co., Chicago, F. M. Link.
Jenkins Bros., New York, W. G. LeCompte, C. J. Jackson and H. B. McLelland.
Consolidated Engineering Co., Chicago, B. Van Auken and R. E. Goldschmidt.
McCrum-Howell Co., New York, A. H. Schroth, William A. Cameron, Thomas J. Cusack, Jr., W. J. Tanvan, Paul R. Schramke, E. H. H. Murray, William Lees, Joseph S. Hailwood, S. O. Dugger, W. H. Coughlin, S. J. Warnock, E. V. Bishop, C. A. Gunther, J. C. Watchett, F. V. O'Neill, Charles E. Dickinson and A. E. Heinze.
Novelty Iron Works, Canton, O., George E. Downe.
Warren Webster & Co., Camden, N. J., John F. Hale, William G. Braemer, J. F. Tuttle, B. Natkin, R. G. Rosenbach and W. H. Chanoweth, Jr.
Manning, Maxwell & Moore, New York, C. Monroe Smith.
International Heater Co., Utica, D. E. McCabe, Chicago manager.
Spencer Self-Adjustable Wrench Co., Minneapolis, Minn., F. S. Spencer.
Williams Tool Co., Erie, Pa., C. A. Eaton.
Standard Steam Specialty Co., New York, P. H. Pinder.
Kroeschell Bros. Co., Chicago, W. L. Kroeschell, A. H. Goetz.
Gurney Heater Mfg. Co., Boston, H. J. Knorr and R. W. Hillman.
Iroquois Engineering Co., Chicago, James J. McAleer, W. L. Bronaugh, R. J. Fitzgerald.
Evans-Almirall Co., New York, J. A. Almirall and Benjamin Kauffman.
Heating and Ventilating Magazine, New York, A. S. Armagnac.
Metal Worker, New York, Frank M. Bailey, F. E. Whiting and Roy F. Saule.
Domestic Engineering, Chicago, Harry de Joannis and Frank Keeney.
Engineering Review, New York, Joseph Graham and George H. Kauffman.
Plumbers' Trade Journal, New York, J. P. Morley, George W. Wood and Albert W. H. Spear.

The Master Steam Fitters' Organizations of Chicago

Chicago boasts of no less than three flourishing organizations of steam and hot water fitting contractors. In view of the recent agitation of the possibility of one or all of these bodies becoming affiliated with the National Association of Master Steam and Hot Water Fitters, it is interesting to understand their local status.

The original organization is the Chicago Master Steam and Hot Water Fitters' Association. This body comprised and still comprises practically all of the important contracting firms in this line in Chicago. The Association, however, has never had a large membership for any length of time and at present is limited to some twenty firms.

There was at one time a brief period during which the majority of all the steam fitting contractors in Chicago were admitted to membership. But the organization quickly became top-heavy, the smaller contractors being able to outvote the larger firms and thus controlling the Association's policy.

This led to a rupture and for a time the Association was quiescent if not, indeed, out of existence. In the reorganization, which took place later, the select few again comprised the membership and the other contractors proceeded to form an organization of their own, which they called the Chicago Steam Heating and Ventilating Engineers.

A number of the members of this body confined their work largely to plumbing contracting. There were apparently some firms in the original organization, also, who were both heating and plumbing contractors, because in the recent labor war in Chicago between the journeymen steam fitters and plumbers, members of both employers' associations formed the nucleus of a third master fitters' organization known as the United Heating and Power Association of Chicago. This third organization is made up entirely of firms which have agreed to use steam fitters belonging to the plumbers' union to the exclusion of those belonging to the steam fitters' union.

At the recent convention of the Na-

tional Association of Master Steam Fitters in Chicago, all three of the local organizations participated in the welcome, although it was made directly through the Chicago Association of Master Steam and Hot Water Fitters. This body had a special room at the Hotel Sherman, which was the headquarters for the convention, and among those who registered there were the retiring president, Charles A. Geoghegan, and the treasurer, J. A. Almirall.

Many courtesies were shown the visiting master fitters and there could be no doubt that the Chicago contractors felt and were glad to express the kindliest of feelings for the members of the National Association.

Among those registering at the Chicago Association's headquarters, whose names are not included in the regular attendance list, are the following:

J. J McKenna, Philadelphia.
Benjamin Kauffman, Chicago.
John Boylston, Chicago.
J. A. Cook, Chicago.
A. H. Goetz, Chicago.
S. R. Lewis, Chicago.
F. J. Englehart, Chicago.

National District Heating Association

THIRD ANNUAL CONVENTION, PITTSBURG, PA., JUNE 6-8, 1911

With a full programme and under favorable conditions of time, place and weather, the National District Heating Association held its third annual convention at the Fort Pitt Hotel, Pittsburg, June 6-8, 1911. The sessions were held in the English room of the hotel, which is of such ample proportions that a part of the hall was allotted to exhibitors, who made a varied and most interesting display

A. D. SPENCER, DETROIT, MICH.
Newly-elected President, National District Heating Association

The first professional session was called to order by President George W. Wright, of Baltimore, who introduced Mr. H. M. Irons, of Pittsburg. Mr. Irons greeted the association on behalf of the mayor. The president then introduced Mr. Garland, vice-president of the Pittsburg Chamber of Commerce, who also welcomed the association to the city.

President Wright then delivered his address in which he dwelt on the rapidly widening field of central station engineering and the many new problems constantly confronting the profession. "Most engineers," he added, "have their scrap heaps which serve to keep their conceit within bounds, and if we have the opportunity it would be well for us to look their exhibits over, as it may inspire us to do better work than the owners of the junk piles."

President Wright suggested the adoption of an official emblem which could be placed on a lapel button or pin.

SECRETARY-TREASURER'S REPORT

In his report Secretary-Treasurer D. L. Gaskill gave the total receipts for the year as $2,482.24, including a balance on hand at the beginning of the year of $164.49. The expenditures were $2,251.38, leaving a balance of $230.86.

An increase in active membership was reported, 62 active members and 14 associate members having been elected during the year.

NEW MEMBERS

The following is a list of the applications for active membership received during the last year:

Evans, Almirall & Co., Chicago, Ill.
Otto E. Osthoff, care H. M. Byllesby & Co., Chicago, Ill.
Michigan Power Co., Lansing, Mich.
Merchants Light, Heat & Power Co., San Francisco, Cal.
Harrisburg Steam Heat & Power Co., Harrisburg, Pa.
Tuscarawas County Electric Light, Heat & Power Co., New Philadelphia, Ohio.
Ernst Schiele, Hamburg, Germany.
York Steam Heating Co., York, Pa.
Erie Company, Erie, Pa.
The Edison Electric Illuminating Co., West Chester, Pa.
Dunkirk Power & Heating Co., Dunkirk, N. Y.
Andrews Heating Co., Minneapolis, Minn.
Waukesha Gas & Electric Co., Waukesha, Wis.
Cheyenne Light, Fuel & Power Co., Cheyenne, Wyo.
Grinnell Electric & Heating Co., Grinnell, Iowa.
Missoula Light & Water Co., Missoula, Mont.
Murry J. Marvin, Wilberforce, Ohio.
F. M. Sinsabaugh, 1009 Main St., Mt. Vernon, Ill.
Frank K. Chew, Editor *The Metal Worker*, New York City.
D. L. Gaskill, Greenville, Ohio.
Miami University Light Plant, Oxford, Ohio.
City Steam Heat & Power Co., Pittsburg.
E. M. Bendure, Central Station Heating Co., Buffalo, N. Y.
W. E. Best, Seattle-Tacoma Power Co., Seattle, Wash.

The following is a list of the applications for associate membership received during the last year:

The Electrical World, New York City.
Westinghouse Machine Company, East Pittsburg, Pa.
Jenkins Brothers, Farnham Yardley, vice-president, New York City.
Richards-Wilson Pipe Covering Co., Grand Rapids, Mich.
H. W. Johns-Manville Co., Pittsburg, Pa.
National Valve & Mfg. Co., Pittsburg, Pa.
J. C. McQuiston, Westinghouse Dept. of Publicity, East Pittsburg, Pa.
Builders Iron Foundry, Providence, R. I.
The Powers Regulator Co., Chicago, Ill.
Power Specialty Co., New York City.
Power, 505 Pearl St., New York.

GROUP OF DELEGATES AT THIRD ANNUAL CONVENTION OF NATIONAL DISTRICT HEATING ASSOCIATION, PITTSBURG, JUNE 6—8, 1911.

Penn Central Light & Power Co., Altoona, Pa.
DeKalb-Sycamore Electric Co., DeKalb, Ill.
Hazelton Steam Heating Co., Hazelton, Pa.
Norristown Steam Heat Co., Norristown, Pa.
Georgia Railway & Electric Co., Atlanta, Ga.
The Denver Gas & Electric Light Co., Denver, Colo.
North Shore Electric Co., Chicago, Ill.
Albert Lea Light & Power Co., Albert Lea, Minn.
Taylorsville Gas & Electric Co., Taylorsville, Ill.
E. J. Bechtol, Detroit, Mich.
Davenport Gas & Electric Co., Davenport, Iowa.
Frankfort Heating Co., Frankfort, Ind.
The Washington Electric Light & Power Co., Washington, Pa.
E. B. Tyler, Wilkinsburg, Pa.
Merchants Heat & Light Co., Indianapolis, Ind.
Yakima Artificial Ice & Cold Storage Co., North Yakima, Wash.
F. C. Chambers, Springfield Light, Heat & Power Co., Springfield, Ill.
A. Beaurrienne, Paris, France.
Red River Power Co., Grand Forks, North Dak.
Edison Elec. Illuminating Co., Cumberland, Md.
Central N. Y. Gas & Elec. Co., Geneva, N. Y.
Federal Engineering Co., Pittsburg, Pa.
Estate of Henry W. Oliver, Pittsburg, Pa.
Edwin Ehinger & Co., Toledo, Ohio.
Canton Gas & Electric Co., Canton, Ill.
Northern Heating & Elec. Co., St. Paul, Minn.
Kenosha Gas & Electric Co., Kenosha, Wis.
D. A. Bonitz & Co., Chicago, Ill.
E. F. Capron, 175 N. Dearborn St., Chicago, Ill.

A report of the Committee on Data was read from text by E. J. Kiefer, of Easton, Pa., chairman, but as it had arrived too late for publication with the other papers, and as the committee was not through with its work, the report was held over, and on motion the committee was continued.

As it was still early in the afternoon two papers on Thursday's programme were advanced and presented at this session, one on "The Heating and Ventilating Equipments of the City Investing Building, New York City," by J. Byers Holbrook (read by Secretary Gaskill), and the other on "Handling Customers," by President G. W. Wright, Mr. Wright's paper being discussed at length.

MORNING SESSION, JUNE 7

The first paper at the Wednesday morning session was on "Heating Franchises," by A. C. Gillham, of the Central Station Engineering Co., Chicago. In the absence of Mr. Gillham this paper was read by W. H. Schott.

Prof. John R. Allen presented a most interesting paper on "Coefficients of Heat Transmission." He reported that the University of Michigan is now engaged in an elaborate series of experiments to determine more accurately the transmission of heat through various building materials.

This was followed by a paper by F. C. Chambers, Springfield (Ill.) Light, Heat and Power Co., on "Results of Measuring Station Load by Venturi and General Electric Meters."

MORNING SESSION, JUNE 8

The first business of the Thursday morning session was the adoption of an amended constitution.

This was followed by the election of officers, as follows:

PRESIDENT

A. D. Spencer, Central Heating Co., Detroit, Mich.

FIRST VICE-PRESIDENT

Warren Partridge, Springfield (Ill.) Light, Heat & Power Co.

SECOND VICE-PRESIDENT

R. D. DeWolf, Rochester (N. Y.) Railway and Light Co.

THIRD VICE-PRESIDENT

Cadwallader Evans, Jr., Oliver Power and Heating Co., Pittsburg.

SECRETARY-TREASURER

D. L. Gaskill, Greenville, O.

MEMBERS OF EXECUTIVE COMMITTEE

E. J. Kiefer, Halcyon Electric Light and Power Co., South Bethlehem, Pa.; J. L. Hecht, North Shore Electric Co., Chicago.

A paper was then read by R. D. DeWolf, of the Rochester (N. Y.) Railway and Light Co., on "The Preparation of a Rational Rate System." This was followed by a paper by W. E. Dowd, Jr., manager of the Philadelphia branch of the Power Specialty Co., on "Superheated Steam." Both of those papers aroused extended discussions.

AFTERNOON SESSION, JUNE 8

The last session was taken up with a report of the Committee on Radiation, followed by two papers on the same general subject, one by Walter J. Kline, of the American District Steam Co., Lockport, N. Y., on "Best Systems of Radiation for Economy and Steam Consumption When Fed from a District Heating Station," and the other by A. C. Rogers, of the Toledo (O.) Railways and Light Co., on the same for hot water.

On motion the Committee on Radiation was continued.

NEW COMMITTEES

On motion of Secretary-Treasurer Gaskill two new standing committees were provided for to take the place of the Committee on Rates. These are a committee of two on rates and a committee of two on uniform station records and accounting. It was also voted to have a committee of two to be appointed by the new president, to select an emblem for the association.

A further motion made by Secretary Gaskill was adopted providing for a standing committee on membership, to consist of seven associate members, the point being made that by making up the committee from those who did more or less traveling, increased opportunities would be presented for adding to the association's membership. The committee on meters was ordered to be continued, to report next year.

President Wright suggested that at the next convention a question box be provided to be opened during the convention. The suggestion will be taken up by the incoming executive committee.

Following resolutions of thanks to the entertainment committee and to the retiring officers, the incoming president took the chair. The new president, Mr. Spencer, expressed his appreciation of the hon-

or that had been bestowed upon him and pledged his best efforts to the further upbuilding of the Association.

The meeting then adjourned.

The Entertainment

A series of entertainment features whiled away the leisure time of the members and guests most delightfully. On Tuesday morning, the opening day of the convention, a trip was made to the pickling works of the H. J. Heinz Co., in Pittsburg. The visitors were entertained at luncheon and every courtesy was extended them to inspect the home of the "57 varieties." In the evening the members were entertained at the Grand Opera House, where they witnessed "A Man's World."

Wednesday morning the ladies were taken in automobiles to Carnegie Institute, followed by a ride through the parks and residential section of Pittsburg. In the afternoon the entire party went by train to the works of the Westinghouse Electric and Mfg. Co., in East Pittsburg, and spent a most enjoyable afternoon in inspecting this mammoth plant. The excursion was in charge of J. C. McQuiston, manager of the publication and publicity departments of the Westinghouse Companies, and the party was treated royally, being taken out to the works at East Pittsburg in a special car. On the return to the city many availed themselves of the invitation extended to visit Pittsburg's Natatorium and enjoy a plunge.

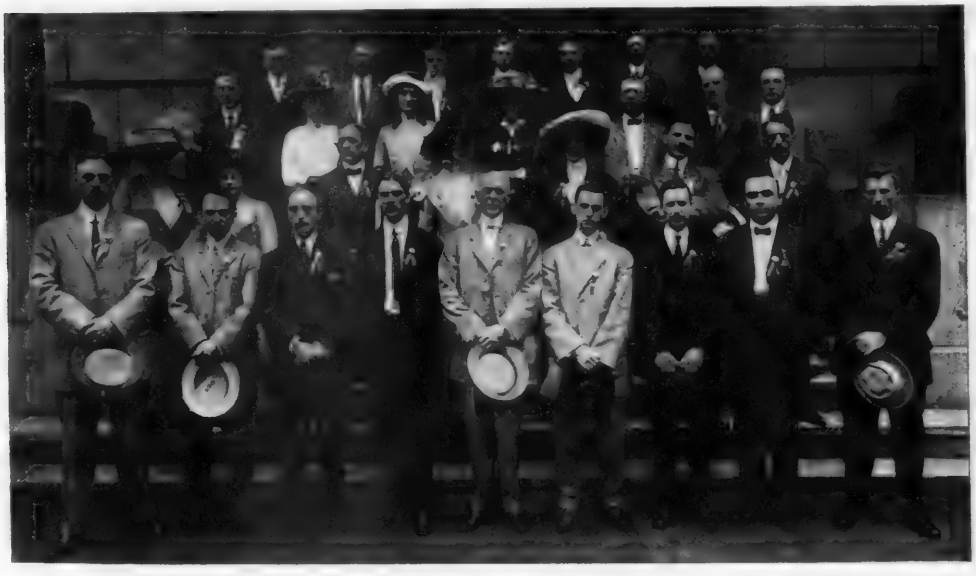
After the extended walk in connection with the inspection of the Westinghouse works, the dip in the Natatorium's large swimming tank was more than refreshing and put the finishing touch on an afternoon full of pleasure and interest.

In the evening the entire party were the guests of the Pittsburg Entertainment Committee, at a reception and smoker on the roof of the Oliver Building. The roof was transformed into a roof garden and was decorated with Chinese lanterns. On a special platform a negro quartette rendered a programme of songs, while at another point on the roof the Westinghouse Orchestra played at intervals throughout the evening.

Seated at small tables the party listened to the music, while a light luncheon, with cigars and cigarettes, was served.

Acting for the entertainment committee, Chairman George R. Folds, Pittsburg manager for the H. W. Johns-Manville Co., expressed the pleasure felt by the committee in entertaining the National District Heating Association. The sentiment was warmly responded to by President G. W. Wright and by Secretary-Treasurer D. L. Gaskill, both of whom voiced the feelings of the entire membership when they stated that the committee had outdone itself in the pleasure it had afforded to all through its generosity. The expressions of thanks which they voiced were encored with a will by the entire company.

Many stayed over after the convention to accept the invitation of the National Tube Co. to visit its steel works Friday morning.



MEMBERS AND GUESTS OF NATIONAL DISTRICT HEATING ASSOCIATION AT PLANT OF THE H. J. HEINZ CO., PITTSBURG.

Members and Guests

Geo. W. Wright, Baltimore Refrigerating and Heating Co., Baltimore.
D. L. Gaskill, secretary-treasurer, Greenville, O.
G. S. Morris, General Electric Co., Schenectady, N. Y.
A. E. Bettis, Kansas City Heating Co., Kansas City, Mo.
J. O. Klingelhofer, American Foundry and Construction Co., Pittsburg.
E. B. Tyler, Tyler Underground Heating System, Pittsburg.
Joseph Graham, *Engineering Review,* New York.
Thomas A. Donkin, Allegheny County Steam Co., Pittsburg.
J. C. McQuiston, Westinghouse Electric and Mfg. Co., Pittsburg.
John Hyde, City Light, Heat and Power Co., Pittsburg.
E. E. Ganss, Robbins Electric Co., Pittsburg.
C. Phillips Hill, Doubleday-Hill Electric Co., Pittsburg.
Geo. W. Provost, Union Electric Co., Pittsburg.
G. R. Folds, H. W. Johns-Manville Co., Pittsburg.
F. R. Low, *Power,* New York.
Mrs. F. R. Low, New York.
W. D. Shaler, Doubleday-Hill Electric Co., Pittsburg.
Cadwallader Evans, Jr., Estate of Henry W. Oliver, Pittsburg.
W. B. Wilkinson, Westinghouse Electric and Mfg. Co., Pittsburg.
J. D. Hiles, Best Mfg. Co., Pittsburg.
Mrs. W. B. Wilkinson, Pittsburg.
E. M. Deeher, American Radiator Co., Pittsburg.
E. H. Eggleston, Jr., American Radiator Co., Pittsburg.
Van A. Reed, Jr., Federal Engineering Co., Pittsburg.
L. C. Frohrieb, Federal Engineering Co., Pittsburg.
J. P. Bordley, Central Station Steam Co., Detroit, Mich.
D. A. Gaskill, Green Electric Light and Power Co., Greenville, O.
J. T. Bulkley, Jenkins Bros., Pittsburg.
Henry B. Smith, Jr., Michigan Pipe Co., Bay City, Mich.
Harvey E. Smith, Terre Haute I. & E. T. Co., Terre Haute, Ind.
E. J. Kiefer, Halcyon E. L. & P. Co., Easton Pa.
A. C. Rogers, Toledo Railways and Light Co., Toledo, O.
A. H. Lamond, Michigan Power Co., Lansing, Mich.
A. D. Spencer, Central Heating Co., Detroit, Mich.
R. D. DeWolf, Rochester Railway and Light Co., Rochester, N. Y.
C. H. Spiehler, Dayton Lighting Co., Dayton, O.
M. K. Zimmerman, Domestic Engineering, East Liverpool, O.
Warren Partridge, Springfield Light, Heat and Power Co., Springfield, Ill.
Grant Miller, Citizens' Lighting and Heating Co., Toledo, O.
S. C. Garner, Hazleton Steam Heating Co., Hazleton, Pa.
J. S. Wise, Jr., Hazleton Steam Heating Co., Hazleton, Pa.
F. C. Chambers, Springfield L., H. & P. Co., Springfield, Ill.
F. W. Wetherell, Peoria Gas and Electric Co., Peoria, Ill.
Harry G. Glass, Westinghouse Electric and Mfg. Co., Pittsburg.
E. A. Knowlton, Schutte & Koerting Co., Pittsburg.
J. V. Redfield, Central Station Steam Co., Detroit, Mich.
James A. Donnelly, Positive Differential System Co., New York.
Mrs. James A. Donnelly, New York.
C. H. Staten, H. W. Johns-Manville Co., New York.
J. S. Hecht, North Shore Electric Co., Chicago.
Frank N. Chew, *The Metal Worker,* New York.
P. J. Morrissey, Central Heating Co., Detroit, Mich.
W. J. Kline, American District Steam Co., Lockport, N. Y.
Robert Hall, American District Steam Co., Lockport, N. Y.
W. H. Schott, W. H. Schott Co., Chicago.
Robert G. Stewart, Tyler Underground Heating Systems, Pittsburg.
E. L. Barnes, American District Heating Co., Chicago.
Chas. T. Klingelhofer, American Foundry and Construction Co., Pittsburg.
Geo. N. Riley, National Tube Co., Pittsburg.
J. J. Kennedy, National Tube Co., Pittsburg.
Lee Phillips, Tyler Underground Heating Systems, Pittsburg.
A. S. Armagnac, THE HEATING AND VENTILATING MAGAZINE, New York.
L. D. West, Cuyahoga Light Co., Cleveland, O.
J. C. Murdock, Strong-Carlisle-Hammond Co., Cleveland, O.
Edwin D. Dreyfus, Westinghouse Machine Co., Pittsburg.
E. H. Caldwell, *Electrical World,* New York.
W. M. Roberts, Jr., Edison Electric Illuminating Co., Cumberland, Md.
J. N. Reeves, Rex Mfg. Co., Johnstown, Pa.
M. F. Strouse, Industrial Engineering Co., Pittsburg.
Wm. Jennings, Steam Heating and Power Co., Harrisburg, Pa.
H. B. Law, Steam Heating and Power Co., Harrisburg, Pa.
L. A. Cramer, Steam Heating and Power Co., Harrisburg, Pa.
W. A. Wolls, Columbus Railway and Light Co., Columbus, O.
H. E. Haller, National Valve and Mfg. Co., Pittsburg.
John D. Walsh, American District Steam Co., Lockport, N. Y.
M. O. Payne, W. H. Schott Co., Chicago.
John R. Allen, University of Michigan, Ann Arbor, Mich.
Paul Mueller, Erie Co., Erie, Pa.
Davis S. Boyden, Edison Electric Illuminating Co., Boston.
Mrs. Edward Gliner, Somerville, Mass.
F. B. Dunlop, Bhom Railway, Light and Power Co., Bohm, Ala.
Geo. H. Criss, Westinghouse Electric and Mfg. Co., Pittsburg, Pa.
J. W. Rudin, Westinghouse Electric and Mfg. Co., Pittsburg.
C. G. Richardson, Builders' Iron Foundry, Providence, R. I.
Thos. H. White, Tri-State News Bureau, Pittsburg.
S. A. Fletcher, Westinghouse Electric and Mfg. Co., Pittsburg.
W. J. Grambs, Seattle Electric Co., Seattle, Wash.
G. E. Quinlan, Seattle Electric Co., Seattle, Wash.
C. L. Strong, Cleveland Steam Trap and Specialty Co., Cleveland, O.
Geo. Hartman, James J. Walker Co., Pittsburg.
Daniel L. Diedrich, James J. Walker Co., Pittsburg.
P. W. Butler, H. W. Johns-Manville Co., Pittsburg.
W. C. Craig, H. W. Johns-Manville Co., Pittsburg.
D. J. Fike, Meyersdale E. L., H. & P. Co., Meyersdale, Pa.
H. H. Lint, Meyersdale E. L., H. & P. Co., Meyersdale, Pa.
F. H. Dimock, Westinghouse Electric and Mfg. Co., Pittsburg.
E. M. Bendure, Central Station Heating Co., Buffalo, N. Y.
W. E. Dowd, Jr., Power Specialty Co., Philadelphia, Pa.
George D. Higgins, Murphy Heating Co., Detroit, Mich.
R. S. Edwards, Union Electric Co., Pittsburg.
D. Hunter, Jr., Underfeed Stoker Co. of America, Pittsburg.
Charles R. Bishop, American District Steam Co., Lockport, N. Y.

Among the Exhibitors at the District Heating Convention

Jenkins Bros., New York, had an interesting display of their line of valves and packings, including globe, angle, check, gate and radiator valves. J. T. Bulkeley, the company's Pittsburg representative, was in charge.

Michigan Pipe Co., Bay City, Mich., showed samples of its low pressure and high pressure steam pipe casings. Henry B. Smith, Jr., was on hand for the company.

General Electric Co., Syracuse, N. Y., had models of its steam, air and water flow meters, which attracted much attention. The company's interests were looked after by Glen S. Morris.

Westinghouse Electric and Mfg. Co., Pittsburg, Pa., had a display of its electric portables. The company had a big delegation on hand, headed by J. C. McQuiston, manager of the publication and publicity departments, and including H. G. Glass, G. H. Criss, W. P. Jand, W. B. Wilkinson, Edwin D. Dreyfus and H. C. Fletcher.

H. W. Johns-Manville Co., New York, had an elaborate exhibition of its line of asbestos products, also a life-sized model of its tile pipe conduit set in gravel. The company was represented by George R. Folds, manager of the Pittsburg branch; C. H. Staten. W. C. Craig and P. W. Butler.

American District Steam Co., Lockport, N. Y., displayed a model of its system of district heating, together with models of many of its other products, including atmospheric heating devices, expansion joints, etc. Charles R. Bishop, secretary, and Robert E. Hall, treasurer; W. J. Kline and E. L. Barnes were on hand in the interests of the company.

American Foundry and Construction Co., Pittsburg, Pa., exhibited a model of the Crescent patent steam pipe conduit, showing especially the sections of the manholes and anchor boxes and also a section through the conduit. Additional exhibits were samples of their high pressure steam piping equipment, together with miscellaneous Crescent apparatus, the Crescent patents being controlled by W. H. Pearce & Co., Chicago. The company was represented by W. L. Klingelhofer, president; J. O. Klingelhofer, secretary and treasurer; C. T. Klingelhofer, superintendent; J. B. Robertson, manager of sales, and Oliver J. Haller, chief engineer.

Best Mfg. Co., Pittsburg, displayed catalogues of its Tuyere cocks and unions, flanged pipe joints, flanged fittings and flanges, flexible joints, exhaust relief and back pressure valves, Gulland stand-pipe and automatic valves. Among the company's representatives on hand were J. D. Hiles, manager of sales; W. J. Prenter, William Latshaw.

Central Station Steam Co., Detroit, Mich., showed types of its gravity rotating condensation meter, also a full line of its diaphragm expansion joints. Another feature of the company's exhibit were sections of the Ric-Wil system of underground pipe covering, for which the company is selling agent. The company was represented by W. V. Redfield, president, and J. V. Bordley.

International Heating and Ventilating Congress

The programme has been received of the Eighth International Congress of Heating and Ventilating Engineers which is being held this month (June 12-14) in Dresden, Germany. Taken in connection with the International Health Exhibition in the same city from May to October, the congress promises to be the most important affair of its kind that has ever been held. A special section of the exhibition is being devoted to heating and ventilating appliances. The programme in detail is as follows:

MONDAY, JUNE 12

Forenoon: First meeting in the aula of the Royal Technical High School, Dresden.

Afternoon: Inspection of Heating and Ventilating Plants. The following buildings have been taken in view: Municipal Offices (Staendehaus), County Court and Prison, Town Hall and Slaughter House.

TUESDAY, JUNE 13

Forenoon: Second meeting in the auditorium of the International Hygiene Exhibition. Report on the exhibition itself, and on the scientific section of the exhibition, ventilating, heating, and collective exhibition of the Union of German Central Heating Engineers. Inspection of the exhibition under the guidance of experts.

WEDNESDAY, JUNE 14

Forenoon: Third meeting in the aula of the Royal Technical High School, Dresden.

Afternoon: Inspection of heating and ventilating plants.

The following lectures will be given at the various professional meetings:

1 Far distance heating;
2 Heating of Schools;
3 Hot Water Supply Plants;
4 Historical development of the science of heating;
5 Reports on hygiene exhibition at Dresden in 1911, and on the special exhibition of heating and ventilating appliances.

The arrangements of the congress are in charge of Dr. Otto Krebs, of Mannheim.

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IF no direct results are to be noted in the journey of the Master Fitters' National Association to the West, the event has, at least, served to clarify the status and viewpoints of both Eastern and Western steam and hot water fitting contractors. The East has had a valuable object lesson presented to it in the shape of prosperous and enthusiastic local master fitters' organizations working individually, it is true, but solving their problems and meeting their situations on the spot, with strict reference to the needs and requirements of their immediate locality. This may not be a broad-minded trade policy, but it serves the immediate purpose and is preferred to the wider, and possibly less definite, activities of a national organization, especially one whose center is and has been for so long in the East.

On the other hand, the evident cordiality displayed by the Western contractors towards their Eastern friends was not to be mistaken. It was plain that no vestige remained of any feeling due to events of by-gone years and the interest they displayed in the convention itself was amply attested to by the large number of Western faces that were to be seen in the convention hall and about convention headquarters.

The national association may well congratulate itself on having gone to Chicago for its 1911 convention. It has more friends in the West than it had before, and, one may hope, it now appreciates more thoroughly the difficulties that lie in the way of a broad organizing movement in that direction. If it does, and would rise to the occasion with a master stroke, let New York be eliminated for a time as national headquarters.

OF quite another character was the convention of the district heating engineers in Pittsburg. This organization is still in the flush of youth, a characteristic that was reflected in the number and quality of the papers presented, and the attention with which the discussions were followed. Our readers will be favored with the most important of these papers, from a heating and ventilating standpoint, as space permits. This young organization continues to show every sign of vigorous life and undoubtedly has a brilliant future before it.

AS usual during the summer months, we will omit the publication of the monthly weather charts for five representative American cities, which have been published in this magazine during the past heating seasons. In the Fall we shall resume the publication of these charts, which will mark the sixth year of their appearance in our columns.

Central Station Heating

3.—"READY TO SERVE" OR "MAXIMUM DEMAND" RATE

By Byron T. Gifford

(Previous articles in this series: "Pipe Line Losses," April, 1911; "Rates," May, 1911.)

THIS method of charge is finding universal favor in connection with public utility service, and is, without a doubt, the most scientific of any method of charge. It is based upon the exact cost of giving service, plus an equitable profit, and the consumer pays for the service in exact proportion to the service he receives.

It has often been said that a public service company should have but one rate to each and every one of its consumers, and from this principle the flat-rate charge was established. The first flat-rate method of charge was based on the cubic foot of contents of the building as a unit. It soon developed that this was not an equitable basis and it was then modified by making different rates for buildings used for different purposes.

The next step toward equitable rates was the charge based on the square foot of radiation as a unit, under the assumption that each square foot of radiation would give off the same number of heat units, but it developed that this assumption is not true, because under different conditions a square foot of radiation will give off a decidedly different number of heat units per square foot, ranging from 300,000 B. T. U. per season to 1,400,000 B. T. U. per season. This method was somewhat improved by charging a given price per square foot of radiation required and used in connection with thermostatic control to regulate the temperature of the buildings heated. This arrangement works out admirably except that it is apt to develop a tendency of carelessness in the consumer, as any flat rate is apt to do.

The meter basis of charge has been instituted and the charge based on the heat consumed, with the condensed steam used as a basis of charge and with 1000 lbs. of condensed steam as a unit. This method of charge seemed for a time to fill the place of an equitable rate, especially with the sliding scale of prices per 1000 lbs., but this method has developed its faults also.

For example: assume a building that uses heat only six hours out of the twenty-four hours in a day. This building demands a place on the line and requires the capacity, both in the mains and at the heating station, to supply its maximum demand. The heating company must be ready to serve this building at any time it requires service. In return for that required condition, the heating company only receives pay for six hours' service, while the building using heat for eighteen

hours pays the company three times the revenue paid by the other building.

It is also the case with churches or auditoriums where heat is used only two or three days out of the week. The heating company must reserve capacities for these buildings, but in return only receives about one-sixth the revenue it would receive from other buildings requiring the capacities that these churches, etc., require. It is obvious, therefore, that a rate based on the number of pounds of steam condensed is far from equitable.

It is here that the "maximum demand" or "ready to serve" rate shows its strong points as an equitable rate. As stated before, this rate is based on the cost of the service to the utility, plus an equitable profit.

We will take for granted that it costs $200,000 to install a non-byproduct heating plant to serve a given territory. In this territory there is available business amounting to 20,000,000 cu. ft. of space, which, for steam heating, will require approximately 200,000 sq. ft. of radiation.

The cost of operating this system is divided into two parts: (1) Fixed charges, such as interest, depreciation, distribution costs and mantenance; (2) generating costs, such as coal, water, power-house labor, and other items that vary with the amount of steam generated.

The generating costs in the plant would probably be as shown below, but this item would change materially, depending upon the cost of fuel, labor and water. We will, however, assume values here so as to more clearly explain the example.

With 200,000 sq. ft. of radiation connected, averaging 600 lbs. of steam per square foot per season, we would have 120,000,000 lbs. of steam to generate. We can also assume 1 lb. of coal will evaporate 5 lbs. of water into steam, and that this coal will cost $2.00 per ton on the plant's siding:

Coal

120,000,000 lbs. ÷ 5 = 24,000,000 lbs. coal.

12,000 tons coal @ $2.00 = $24,000.00 = 20c per 1000 lbs. steam.

Labor

The labor in this plant would cost about as follows:

1 Chief Engineer	$1,200.00
1 Assistant Engineer	900.00
6 Firemen (9 months)	3,240.00
	$5,340.00 = 4.5c per 1000 lbs. steam.

General Expense

Repairs, renewals and supplies	$600.00
One-half office expenses	1,460.00
One-half incidental expenses	500.00
	$2,560.00

Water

Water @ 5c per 1000 gals. (15,00,000) = $750.00.

Recapitulation of Generating Costs

Coal	$24,000.00
Labor	5,340.00
General expense	2,560.00
Water	750.00
	$32,650.00 = 27c per 1000 lbs. steam generated.

The fixed charges on a plant of this kind would be approximately as follows:

Interest—	
6% on $200,000.00	$12,000.00
Taxes and Insurance—	
1½% on $200,000.00	3,000.00
Depreciation—	
3% on $200,000.00	6,000.00
Maintenance—	
Estimated	1,000.00
Distribution Costs—	
One-half office expense	1,460.00
Officers' salaries	5,400,00
One-half incidental expenses	500.00
Line loss	4,334.00
	$33,694.00

The line loss is figured at the rate of 0.050 lb. steam per square foot of pipe-line surface, per hour, based upon the following line:

Diameter in inches.	Sq. ft. of surface in the pipe line and fittings.
16	7,961
12	11,700
10	14,612
8	11,070
6	10,847
5	2,482
4	3,068
	61,740

61,740 × 0.050 = 3087 lbs. steam per hour.

5,200 hours = 16,052,400 lbs. @ 27c per 1000 lbs. = $4,334.00.

With a fixed charge of $33,694.00 per season to distribute heat to 200,000 sq. ft. of radiation it is seen that it costs 16.84c per square foot to distribute the heat. We have also determined that it costs, under the assumed conditions, 27c to gen-

erate 1000 lbs. of steam. We know now what our costs are and in order to determine our selling rate we must add our profit, which should be reasonable.

It is generally conceded that 10% is an equitable income on the money invested, and, that being the case, we have 4% on $200,000.00 to add as profit (6% has already been accounted for under interest). 4% on $200,000 = $8,000.00. This item can be charged, either all to fixed charges or one-half to fixed charges and one-half to generating. The author prefers the latter scheme.

This profit added brings our fixed or service charge up to $37,694.00 per season, and this is equal to 18.84c or 19c per square foot per season. Our rate for steam used would also be increased to $36,650.00 for 120,000,000 lbs., which equals 30½c per 1000 lbs.

Under the conditions above noted, a non-byproduct plant should charge a service rate of 19c per square foot and a meter rate of at least 30c per 1000 lbs. of condensation.

In a byproduct plant the rate to be charged is figured the same way as the above.

The service charge should be paid by the consumer as any flat rate is paid, in installments either monthly or quarterly.

Mr. Gifford's next article will appear in the July issue.

Ventilation Law for North Dakota

In an act approved March 6, 1911, North Dakota has added its name to the ranks of the compulsory-ventilation-law states.

The bill was introduced by Mr. Price in the House, and was designed to govern the construction of public-school buildings and to provide for the inspection, ventilation and sanitation thereof. The full text of the act is as follows:

"Section 1. No building which is designed to be used, in whole or in part, as a public-school building, shall be erected until a copy of the plans thereof has been submitted to the State Superintendent of Public Instruction, who for the purposes of carrying out the provisions of this act is hereby designated as inspector of said public-school building plans and specifications, by the person causing its erection by the architect thereof; such plans shall include the method of ventilation provided therefor, and a copy of the specifications therefor.

"Sec. 2. Such plans and specifications shall show in detail the ventilation, heating and lighting of such building. The State Superintendent of Public Instruction shall not approve any plans for the erection of any school building or addition thereto unless the same shall provide at least 12 sq. ft. of floor space and 200 cu. ft. of air space for each pupil to be accommodated in each study or recitation room therein.

"1. Light shall be admitted from the left or from the left and rear of classrooms and the total light area must, unless strengthened by the use of reflecting lenses, be equal to at least 20% of the floor space.

"2. All ceilings shall be at least 12 ft. in height.

"3. No such plans shall be approved by him unless provision is made therein for assuring at least 30 cu. ft. of pure air every minute per pupil and warmed to maintain an average temperature of 70° F. during the coldest weather, and the facilities for exhausting the foul or vitiated air therein shall be positive and independent of atmospheric changes. No tax voted by a district meeting or other competent authority in any such city, village, or school district, exceeding the sum of $2000.00 shall be levied by the trustees until the State Superintendent of Public Instruction shall certify that he plans and specificaions for the same

comply with the provisions of this act. All school houses for which plans and detailed specifications shall be filed and approved, as required by this act, shall have all halls, doors, stairways, seats, passageways and aisles and all lighting and heating appliances and apparatus arranged to facilitate egress in case of fire or accident and to afford the requisite and proper accommodations for public protection in such cases. All exit doors shall open outwardly, and shall, if double doors be used, fasten with movable bolts operated simultaneously by one handle from the inner face of the door. No staircase shall be constructed with wider steps in lieu of a platform, but shall be constructed with straight runs, changes in direction being made by platform. No doors shall open immediately upon a flight of stairs, but a landing at least the width of the door shall be provided between such stairs and such doorway.

"4. Every public school building shall be kept clean and free from affluvia arising from any drain, privy or nuisance, and shall be provided with sufficient number of proper water closets, earth closets or privies, and shall be ventilated in such a manner that the air shall not become so impure as to be injurious to health.

"Sec. 3. No toilet room shall be constructed in any public-school building unless same has outside ventilation and windows permitting free access of air and light. The provisions of this act shall be inforced by the State Superintendent of Public Instruction or some person designated by him for that purpose.

"Sec. 4. If it appears to the State Superintendent of Public Instruction, or his deputy appointed for that particular purpose, that furher or different sanitary or ventilating provisions, which can be provided without unreasonable expense, are required in any public-school building, he may issue a written order to the proper person or authority, directing such sanitary or ventilating provisions to be provided. A school committee, public officer or person who has charge of any such public-school building, who neglects for four weeks to comply with the order of said State Superintendent of Public Instruction or his deputy shall be punished by a fine of not less than $100.00 nor more than $1000.00.

"1. Whoever is aggrieved by the order of the State Superintendent of Public Instruction or his deputy issued as above provided, and relating to a public-school building, may within thirty days after the service thereof apply in writing to the board of health of the city, town, incorporated village or school district to set aside or amend the order; and thereupon the board, after notice to all parties interested, shall give a hearing upon such order, and may alter, annul or affirm it.

"Sec. 5. No wooden flue or air duct for heating or ventilating purposes shall be placed in any building which is subject to the provisions of this act, and no pipe for conveying hot air or steam in such building shall be placed or remain within 1 in. of any woodwork, unless protected by suitable guards or casings of incombustible material.

"Sec. 6. To secure the approval of plans showing methods or systems of heating and ventilation as provided for in Section 2 the foregoing requirements must be guaranteed in the specifications accompanying the plans. Hereafter erections or constructions of public-school buildings by architect or other person who draws plans of specifications or superintends the erection of a public-school building, in violation of the provisions of this act, shall be punished by a fine of not less than $100.00 nor more than $1000.00.

"Sec. 7. All acts or parts of acts in conflict herewith are hereby repealed.

"Sec. 8. Whereas, there being no adequate law on the statute books governing the subject matter, therefore an emergency exists and this act shall be in force and effect from and after its passage and approval."

Mid-Summer Meeting in Chicago, July 6-8

At a meeting of the Board of Governors, held May 27, it was decided to hold the semi-annual (mid-summer) meeting of the American Society of Heating and Ventilating Engineers in Chicago, July 6-8, 1911. Headquarters will be at the La Salle Hotel.

Committee Appointments

Announcement has been made by Secretary W. W. Macon of the following committees to carry on the work of the Society during the present year:

STANDARDS

J. J. Blackmore (chairman), Ralph Collamore, Roy E. Lynd, E. A. May, P. H. Seward.

TESTS

W. H. McKiever (chairman), F. T. Chapman J. A. Donnelly, N. S. Thompson, M. F. Thomas.

HEATING GUARANTEES

W. M. Mackay (chairman), Thomas Morrin, G. W. Scott, F. C. Goff, C. E. Pearce.

SCHOOLROOM VENTILATION

F. I. Cooper (chairman), C. B. J. Snyder, E. D. Densmore, C. F. Eveleth, H. W. Whitten.

AIR LEAKAGE AND VENTILATION OF THE CLOSED ROOM

Prof. J. H. Kinealy, general chairman.

Massachusetts: H. W. Whitten (chairman), R. L. Folsom, D. S. Boyden, Charles Morrison, L. G. Robbins.

Pennsylvania: I. H. Francis, Jr. (chairman), Homer Addams, E. S. Berry, J. E. McGinness, J. P. Schaffer.

Missouri: B. C. Davis (chairman), H. H. Humphrey, J. M. Kent, F. N. Jewett, Samuel Kauffman.

REVISION OF THE CONSTITUTION

Prof. Wm. Kent (chairman), Prof. R. C. Carpenter, W. G. Snow, S. A. Jellett, F. K. Chew.

Committees on compulsory ventilation are also at work in Massachusetts, New York, Maryland, Illinois, Indiana and Tennessee.

Legal Decisions

Guaranty of Steam Plant—Change in Contract

A contract for the construction of buildings contained certain guarantees by the contractor, including a guarantee of the steam plant and its appurtenances to be in first-class working order and condition, and to supply the heat mentioned in the specifications for the term of one year from a certain date. Certain disputes having arisen between the parties, a second agreement was entered into, reciting the settlement of the disputes and the payment by the owner of a sum for his discharge under the first contract. The agreement also stipulated for the delivery of certain specified guarantees by the contractor to the owner. It was held that the guarantees of the first contract were not discharged by the second agreement. The contractor remained liable thereunder until he had delivered the guarantees required by the second agreement.—Cohan vs. Rosenberg, New York Supreme Court, Appellate Term.

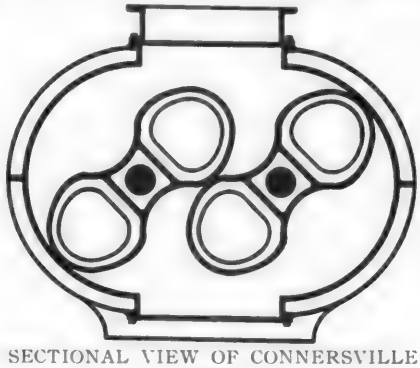
NEW DEVICES

Rotary Vacuum Heating Pumps

The application of a rotary cycloidal pump to the field of vacuum heating engineering is an interesting development of the Connersville Blower Co.'s high vacuum pump. The first pumps designed by this company were used in connection with jet condensers for steam turbines, where a vacuum within 2 in. of the barometer is required. The same standard of design, workmanship and material which made these pumps successful for condenser work, has been applied in developing a line suitable for the vacuum heating trade.

This pump has no valve springs or small parts to get out of order, and has an opening inlet of large area, thus avoiding the resistances such as are encountered with piston pumps through the valve and ports. There are no clearance spaces, nor pockets in which the air and vapors can be compressed and re-expanded, and no internal parts requiring lubrication. The cross section through the cylinder shows the working parts. The impellers do not touch each other nor the surrounding case. The return water lying on top of the impeller forms a water seal, adding to the efficiency of the pump. The parts forming the frame are rigid, and all the bearings are ring oiling, a feature designed to reduce the care of oiling to a minimum.

A rotary pump, owing to the comparatively high speed at which it runs, is more suitable for electric drive than a piston pump; it is particularly well adapted for use in those buildings where all



SECTIONAL VIEW OF CONNERSVILLE PUMP

electric power is supplied from a central plant, and where a low pressure boiler carrying steam of ½ lb. to 1 lb. pressure could be used if steam of a higher pressure for operating the vacuum pump was not required. Also in plants where the firing of the boilers is irregular the use of an electric driven pump is a distinct advantage, as it will maintain the circulation as long as any steam is available, regardless of the pressure. This pump serves both as an air and a water pump, and will return the water of condensation direct to boiler, doing away with the feed pump.

It will operate successfully with very hot water, and maintain a corresponding vacuum. This is not true of a piston pump, because the vacuum in the cylinder is necessarily higher than the vacuum outside the valves, due to the resistance of the valves and ports, and due to overcoming the inertia of the water when the piston starts, and is coming up to full speed. In piston pumps when the

vacuum carried is near to that corresponding to the temperature of the water, the higher vacuum inside the pump cylinder causes a re-evaporation of the water in the cylinder, under which condition no outside work will be done and the pump will race. It is found that these pumps require less power than a piston pump, and cost considerably less for up-keep.

They are made in a wide range of sizes for displacements from 40 gals. per min. to 10,000 gals. per min., and can be secured from any of the vacuum heating companies, or steam fitting contractors. The same type pump can also be used for house pumps, etc.

A Steam Turbine for Driving Direct-Current Generators and Other Low or Moderate Speed Machinery

Steam turbine builders are making many modifications of type just now, all, or nearly all, of which are steps in the direction of reconciling the high velocity of the steam turbine bucket with the more moderate speed at which the driven machine, such as direct-current generator, fan, pump, etc., should properly run.

The accompanying description of a direct-current turbo-generator exemplifies a method by which it is possible to retain the advantages in the way of efficiency, low cost and simplicity inherent in the use of high bucket speeds with the practical and theoretical benefits of low speeds in the generator or other driven machine.

This compromise is by the use of helical gears, which were first applied to turbines of moderate size over twenty years ago by DeLaval and which, during the last four years, have been developed for application to large size turbines, including the perfection of special methods of building, etc., whereby highly efficient, silent and durable gears are obtained.

Speaking generally, the large size steam turbine has so far found application only for the driving of alternators and the propulsion of ships. Little progress, comparatively, has been made in its adaptation for driving direct-current generators, and for direct connection to other machinery of moderate speed, such as centrifugal pumps and blowers, or for the driving of machinery by means of ropes or belts. While the suitability of the turbine for these purposes, because of its simplicity, small weight and space requirements, good steam economy and in recent years lower price, is apparent, the engineering world has, nevertheless, awaited the practical solution of the problem of driving such machines by steam turbines.

The nature of the difficulty is, at once, apparent, from a simple statement of the velocities, etc., involved. The expansion of one pound of steam from 150 lbs. pressure (164.7 lbs. absolute) to a 28-inch vacuum renders available for conversion into work 325 B. T. U., equal to 252,850 foot pounds of energy. If the expansion be accomplished in one nozzle having unit efficiency, the resulting velocity of the steam will be 4040 ft. per second.

In view of the pressing nature of the speed-reduction problem, the turbo-generator described herewith possesses considerable theoretical and practical interest.

The unit shown in Fig. 1 consists of a multi-stage turbine driving a standard speed, direct-current Crocker-Wheeler generator through a pinion and single gear, the speed of the turbine shaft being 3600 R. P. M. and the speed of the generator shaft 500 R. P. M. The photograph will give a good idea of the compact nature of the construction of a turbine, the maximum capacity of which is 1200 H. P.

Steam is admitted to the turbine first through a strainer case and then through a combined trip and throttle valve, to be seen at the extreme right; next through the adjacent governor valve and then, after passing through steam nozzles of the standard DeLaval type, impinges upon the blades of the

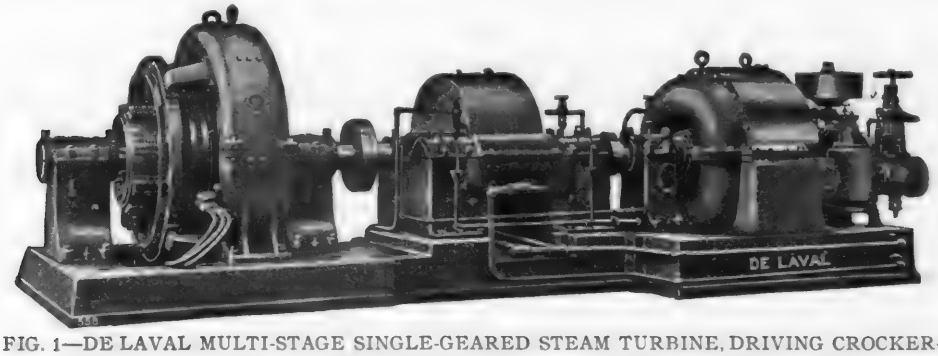


FIG. 1—DE LAVAL MULTI-STAGE SINGLE-GEARED STEAM TURBINE, DRIVING CROCKER-WHEELER DIRECT-CURRENT GENERATOR. CAPACITY 500 KW. SPEED 500 R.P.M. HIGH PRESSURE TYPE

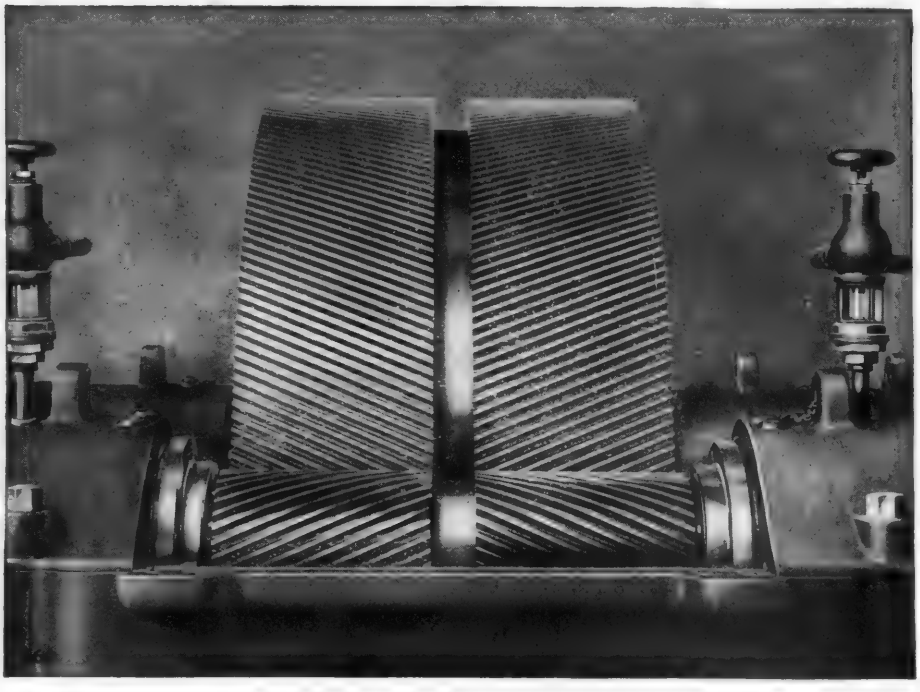


FIG. 2—GEAR AND PINION OF THE DE LAVAL MULTI-STAGE, SINGLE-GEARED TURBINE, IN PLACE IN GEAR CASE

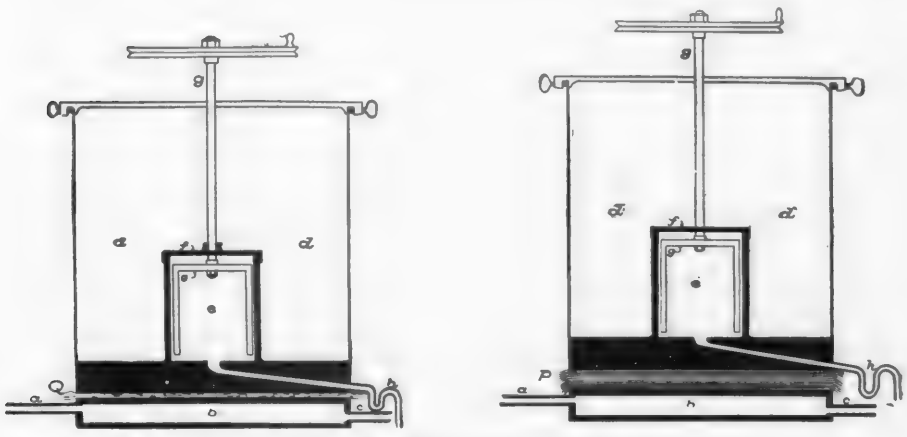
first-stage wheel. Partial admission is used in the first stage, but full admission in later stages. The wheels are of the standard DeLaval type, made of such section as to give great strength throughout. The buckets are set in the rim by a peculiar form of dovetail.

The pinion and gear, perhaps the most important and interesting part of the construction, is shown in Fig. 2. The gear consists of a solid cast-iron center upon which are shrunk two thick steel rings. The hub is mounted on a stiff shaft, which carries at one end a half of the flexible coupling for connection to the driven machine.

A New Heat Insulator and Sound Deadener

Cabot's "Quilt" is a new product, based on an old idea, for furnishing a scientific heat insulator and sound deadener. It is a felt matting of cured eel-grass stitched with strong thread, and laid between two layers of tough "Kraft" paper. It is used as a lining in houses, for deadening sound in floors and partitions, for insulating cold stores, refrigerators and ice houses. The eel-grass fibres are long and flat, and cross each other at every angle, making a thick, elastic cushion filled with dead air spaces. Eel-grass, the makers state, will not decay, will not harbor insects or vermin, is not inflammable and will not be eaten by rats or mice. This "quilt" is now furnished in the form of rolls in place of bales, the rolls eliminating the folds in the quilt and enabling it to be easily handled. It is made in six different grades.

CABOT'S "QUILT," FOR HEAT INSULATING AND SOUND DEADENING, SHOWING MATTING OF CURED EEL GRASS



APPARATUS FOR TESTING INSULATING MATERIALS

In a series of tests on this material, the apparatus shown in the accompanying illustrations was used. The test demonstrated that one layer of doubleply "quilt" was more efficient as a heat insulator than forty layers of building paper.

In these tests steam was used to give a uniform known high temperature, and ice to give a uniform known low temperature, so that exact results would be insured. Steam flows from pipe (a) to pan (b) and out at outlet (c). This produces the uniform high temperature under the material to be tested (P) or (Q); (d) is a chamber filled with broken ice, which surrounds the calorimeter (e) on all sides except the bottom, thus producing the uniform low temperature around the calorimeter, which is filled with fine cracked ice, is covered by a water-tight cover (f), and the ice is gently agitated with the stirrer (g). The ice in the calorimeter (e) is melted by the heat transmitted from the steam pan (b) through the insulating material (P) or (Q), and in no other way, as it is surrounded on all other sides by a freezing temperature. The melted ice from the calorimeter (e) flows out through the drip (h) and the amount of ice melted in the calorimeter (e) gives the efficiency of the insulating material.

Cabot's "Quilt" is made and sold by Samuel Cabot, Inc., Boston, Mass.

A 32-Ft. Fan For a Yarn Mill

One of the largest fans ever made is shown in the accompanying illustration. It is over 32 ft. high and was made by the Buffalo Forge Co., to be used in connection with a heating, ventilating and air conditioning system, supplying 25,000 cu. ft. of air per hour to the employees in the new mill of the Sharpe Mfg. Co., New Bedford, Mass., the largest individual yarn mill in that city.

In this mill particular consideration is given to the hygienic conditions of operation. The air is washed before entering the mill, all dust, dirt and foreign matter being removed. In winter the air is heated to any desired temperature, a feature being independent regulation on each floor. Provision is also made for cooling the air, so that in the hottest days of summer the temperature throughout the mill, even in the spinning room where machinery generates an immense

32-FT. FAN MADE BY THE BUFFALO FORGE CO. AND INSTALLED IN PLANT OF SHARPE MFG. CO., NEW BEDFORD, MASS.

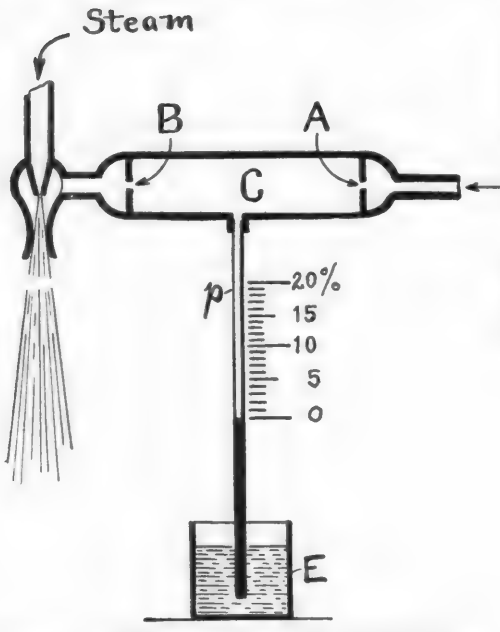


FIG. 1—SHOWING PRINCIPLE OF THE UEHLING WASTE METER FOR MEASURING PER CENT CARBON DIOXIDE OR TEMPERATURE

amount of heat, is from 15° to 20° cooler than is possible by ordinary window ventilation.

The volume of air that the fan handles to achieve these results reaches the total of 20,000,000 cu. ft. per hour.

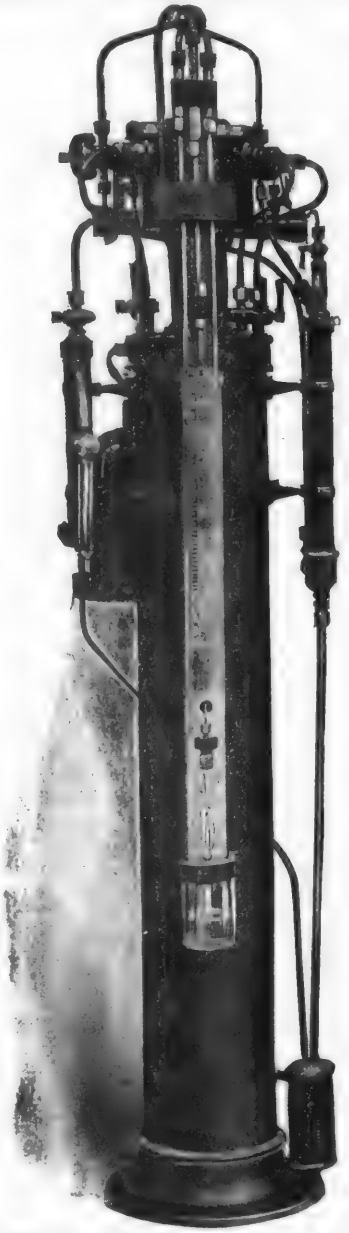
An Improved CO_2 Recorder.

On the average it may be stated that only 60% of the heat in the coal enters the boiler; 40% is wasted. Of this 40% the total waste is distributed about as follows: loss in radiation, 5%; loss in soot and smoke, 1%; loss represented by actual loss of coal through the grates, 2%; loss due to combustion of the carbon to carbon monoxide instead of dioxide, 2%; heat carried away by the chimney gases due to their temperature, 30%.

The relation between per cent. carbon dioxide and heat lost is shown diagramatically by the chart (Fig. 2). The areas in each case are proportional to the amount of heat wasted, and as these areas are reduced by decreasing the excess air the per cent. of CO_2, it will be noted, is increased.

The fact that caustic potash absorbs carbon dioxide is the fundamental principle of all instruments for making a measurement of CO_2. In the older types of automatic recording instruments, bells or jars for measuring the gases before and after the CO_2 was absorbed were used. The difference in volume of the gas before and after the CO_2 was abstracted gave a measurement of carbon dioxide in the gases.

If instead of measuring the per cent. carbon dioxide by measuring the actual volume of a given amount of gas before and after the carbon dioxide has been abstracted from it, the pressure of the gas is measured, then the change in pressure of the gas due to the reduction in its volume when the CO_2 is absorbed will give a ready and reliable method of measurement. By this means the record



THE UEHLING WASTE METER OR SINGLE COMBINED CARBON DIOXIDE AND TEMPERATURE MACHINE

may be made continuous, and indicating devices may be used in connection with the machine. The machine also gives for measuring both percentage of carbon dioxide and temperature. Gas is drawn through the apparatus continuously by a

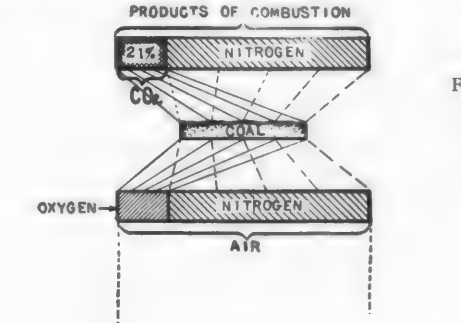


FIG. 2—CHART (a) SHOWING HOW WITH THE THEORETICAL SUPPLY OF AIR, THE PER CENT CO_2 IN THE PRODUCTS OF COMBUSTION IS THE SAME AS THE PER CENT OXYGEN IN THE AIR

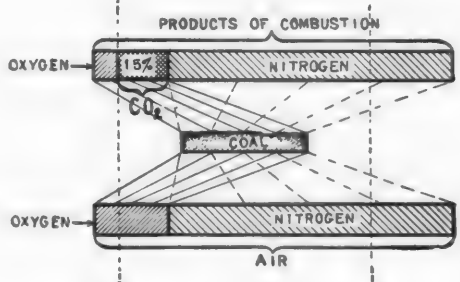


FIG. 2—CHART (b) SHOWING HOW IN EXCELLENT PRACTICAL COMBUSTION, WITH 40% EXCESS AIR THE PER CENT CO_2 IS 15.

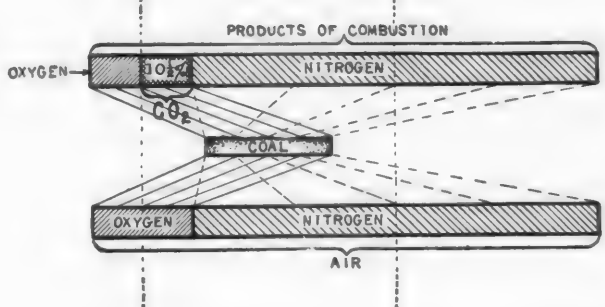


FIG 2—CHART (c) WITH 100% EXCESS AIR, ONLY HALF THE OXYGEN IS USED AND THE PER CENT CO_2 IS ONE-HALF OF 21 OR 10½

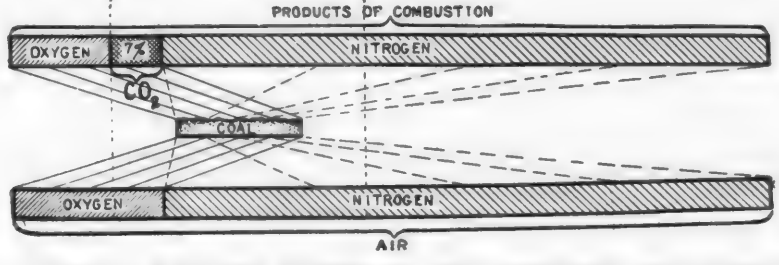


FIG. 2—CHART (d) WITH 200% EXCESS AIR, ONLY ONE-THIRD THE OXYGEN SUPPLIED IS NEEDED AND THE PER CENT OF CO_2 IS ONE-THIRD OF 21 OR 7

both carbon dioxide and temperature, which may be automatically recorded on charts at the most convenient points.

Fig. 2 shows how this principle is employed in the Uehling Waste Meter small steam aspirator. In chamber C the carbon dioxide is absorbed (in the case of the carbon dioxide instrument), and thus the volume of the gas between the apertures is reduced by an amount

depending upon the amount of CO_2 present. Any reduction in the volume of the gas between the two apertures increases the vacuum. These changes are proportional to the amount of CO_2 absorbed, and thus the suction or partial vacuum forms a basis for indicating and recording variations in carbon dioxide in flue gases.

The indicating instruments are simply columns properly calibrated and are supplied at the machine proper and also for the front of the boiler.

As the same principle and similar apparatus is used to measure temperature, a very effective combined CO_2 machine and temperature machine or waste meter may be built on this principle. In measuring temperatures, instead of the change in vacuum being produced by absorbing part of the gas between the apertures, change in vacuum is secured by reason of the difference in temperature between the two apertures. One aperture is in a nickel tube, placed in the flue or other part of the furnace, and the other maintained at a constant temperature by exhaust steam.

A Comprehensive Boiler and Radiator Catalogue

A handsome catalogue of unusual interest has lately been compiled by the United States Radiator Corporation and is now ready for distribution. New illustrations are shown of Improved United States Boilers, which include the Capitol sectional type and the Capitol Solar round boiler which were manufactured by the United States Heater Company, Detroit, Mich.; of the Furman sectional boiler and the Furman round boiler which were manufactured by The Herendeen Mfg. Co., Geneva, N. Y., and of the Sunray sectional type that were made by The J. L. Mott Iron Works, at West Newton, Pa.

What is stated to be the widest range in capacities ever offered by one manufacturer is included in the Complete Line, the steam boilers ranging in size from 250 sq. ft. to 8550 sq. ft., and the water boilers from 425 sq. ft. to 14,100 sq. ft. Each rating is guaranteed.

Six different patterns of United States radiators are presented, including the Puritan plain pattern and the Florentine ornamental pattern formerly manufactured by the United States Heater Co., Detroit; the Triton plain, Triton ornamental pattern and the Triton Flue Radiator formerly manufactured by the United States Radiator Co., Dunkirk; the Sunray ornamental, the Grecian plain and the Utility pattern formerly made, along with Athenian wall pattern, at West Newton and Corry, Pa., plants by the J. L. Mott Iron Works and the United States Radiator and Boiler Co.

The company's line of radiator specialties includes corner, curved, oven and pantry radiators, with all such novelties as adjustable feet and high and low legs.

Besides a complete line of standard steam and hot-water valves, the company offers the the Triton packless radiator valve for steam; also the Triton packless radiator valve for hot water, which is stated to be the only packless hot-water valve on the market.

Air and vacuum valves of improved type, Capitol automatic draft regulators, radiator shields and foot rests and radiator trucks are also included among the company's specialties.

Toward the end of the catalogue are found a number of tables on heating subjects, such as chimney flues, heat measurement, etc. There are also given pages covering repair parts on all makes of boilers and tank heaters, and the necessary telegraph code.

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TRADE AND MISCELLANEOUS NOTES

Coming Event

July 6-8, 1911. Semi-annual meeting of The American Society of Heating and Ventilating Engineers, Chicago, Ill. Headquarters at the La Salle Hotel.

Miscellaneous Notes

United Heating and Power Association of Chicago is a new organization of master plumbers who are also engaged in the heating business. The members were formerly affiliated with the Chicago Steam Heating and Ventilating Engineers. The new body has organized with the following officers: President, John J. O'Shea; vice-president, H. P. Reger; treasurer, A. Nilson; secretary, J. J. Cahill; board of directors, above named officers and William Downs, A. W. Wills and C. E. Tandy. The organization has started with a membership of 28 firms, including the following:

W. A. Bunge, 120 Lake street, Oak Park, Ill.; A. J. Busch, 859 Diversey boulevard; F. E. Butts, 6306 Lexington avenue; J. J. Cahill, 830 Hamlin street, Evanston, Ill.; J. H. Doose, 1615 Benson avenue, Evanston, Ill.; Wm. Downs, 4031 State street; J. J. Dunbar & Co., 1104 West 63rd street; Dwyer & Co., 59 Dearborn street; B. J. Farwell, 42 Sherman street; Gilbert & Hungerford, 6327 Lake street, Oak Park, Ill.; Wm. Goyette, 1453 East 55th street; Hanley-Casey Co., 404 Ohio street; J. P. Heintz, 1127 Argyle street; T. G. Irving, 210 Lake street, Oak Park, Ill.; Samuel Kersten, 210 East Van Buren street; Lawrence & Stewart, 2906 Madison street; George Lillig & Co., 351 North 52nd avenue; E. J. McDonough, 901 East Belmont avenue; Nelson & Wagner, 130 North Oak Park avenue; Nilson Brothers, 901 East Belmont avenue; Noble & Thumm, 2313 Lincoln avenue; O'Shea Bros., 3550 North Clark street; M. L. O'Malia, 908 Chicago avenue, Evanston, Ill.; Park Bros., 1564 Sherman avenue, Evanston, Ill.; H. P. Reger, 5514 Lake avenue; C. E. Tandy, 6842 Wentworth avenue; Wills & Smith, 5938 South Halsted street, and Zimmerman Bros., 103rd street and Avenue J, South Chicago.

Jamestown, N. D.—A new heating plant to cost $12,000 will be installed at Jamestown College, a donation of $6,000 having been duplicated by funds raised by the college. The new heating plant will occupy a separate building to be

ROBERT A. KEASBEY CO.

"RAKCO" BRAND PACKINGS and GASKETS OF ALL KINDS

100 North Moore Street
NEW YORK CITY

Send for Sample of "RAKCO" Red Rubber Sheet Packing, Style No. 10.

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MADE TO FIT ALL SIZES

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THE ARMSTRONG MFG. CO.

321 Knowlton St., Bridgeport, Conn.

CATALOG MAILED ON REQUEST

built northeast of the president's home.

Sioux Falls, S. D.—The Custer City council has granted to the Custer Electric Light, Heat and Power Co. a 50-year franchise to operate an electric light system and power and heating plant in this city. Following are the company's officers: President, E. L. Grantham; vice-president, Joseph Kubler; secretary, H. E. Way; treasurer, T. W. Delicate.

Springfield, Ill.—A strike of operators on account of poor ventilation is reported from the Desnoyer shoe factory in Springfield. The management had painted and nailed down the windows. The men appealed to the city authorities without effect and then sent an appeal to the State factory inspector on the ground that the building constituted a fire trap.

Streator Heating & Light Co., Streator, Ill., is planning an extension of its heating mains in the residential section of Streator.

Hardy S. Ferguson, formerly chief engineer for the Great Northern Paper Co., has opened an office as consulting engineer at 200 Fifth avenue, New York. Mr. Ferguson will specialize in engineering work in connection with paper, pulp and fibre mills, including buildings and complete mechanical equipment.

University of Illinois Engineering Experiment Station will shortly publish a bulletin giving the results of recent fuel tests of house-heating boilers, conducted by Frank L. Busey, of the experiment station.

American Sheet and Tin Plate Co., Pittsburg, Pa., will equip its hot mill departments with air cooling systems.

Federal Furnace League has secured new headquarters at 1430 South Penn Square, Philadelphia. The office of president has been filled by the election of William J. Myers, who had been elected chairman of the executive committee. Charles S. Prizer was thereupon made chairman of the executive committee. Mr. Myers has just closed a term as president of the National Association of Stove Manufacturers.

Charles H. Simmons, president of the John Simmons Co., sailed for Europe May 20, with his family. He will be away two months.

Bangor, Me.—Among those who suffered losses in Bangor's $6,000,000 fire are the Fairbanks Co., dealers in heating and plumbing supplies; Noyes & Nutter, dealers in heating supplies; C. H. Rabb & Co., and Clement, Carter & Co., heating and plumbing contractors.

THE VALVE THAT WORKS

89 Mowell Automatic Relief Valves are installed in the Doherty Silk Mill, in Paterson, one of the most up-to-date plants in the country and THE SYSTEM WORKS PERFECTLY

Send for descriptive matter, telling how the Mowell Automatic Relief Valve is suited to Exhaust and Low Pressure Steam Heating, how it expels all air and water from the radiator and how easy it is to keep clean.

Augustus Mowell

249 Graham Avenue, PATERSON, N. J.

New Firms and Business Changes

Hern, Furlong Co., Boston, Mass., engineers and contractors for power, heating and ventilation, have opened an office at 149 Pearl street. The firm is composed of Joseph L. Hern, formerly superintendent of heating and ventilation with the School House Commission, Boston, and Francis J. Furlong, formerly superintendent of construction with the Cleghorn Co., Bradlee & Chatman and J. P. Dwyer.

Eastern Supply Association will hold its mid-summer meeting Thursday, June 22, 1911, at the Chalfonte, Atlantic City, N. J.

Houston, Texas.—An organization of a company to manufacture orchard heaters in Houston is now being planned by Dr. L. W. Fisher and F. H. Hammer of San Francisco, Cal. Such heaters have been tested in Colorado, California, and in other states in old fruit-growing districts. They are universally indorsed by the California Fruit Growers' Erchange. The advent of the heater in Texas next winter will serve to develop the citrus fruit industry on the gulf coast.

Bayley Heating Supply Co., Milwaukee, Wis., is the changed name of the Bayley Heating Co., of that place.

Hamilton, Ohio.—Plans will be drawn shortly by Architect George Barkman for a new steam heating plant for the county infirmary.

Manufacturers' Notes

Crane Valve Co., Bridgeport, Conn., is building a heavy machine shop 50 ft. x 355 ft., adjoining its plant in Bridgeport.

American Radiator Co. has sold its large warehouses at Harrison, N. J., and the company's stock will be transferred temporarily to the company's warehouses at 49 Communipaw avenue, Jersey City, N. J. It is now definitely known that the American Radiator Company has purchased 8½ acres in Bayonne with a frontage of 750 ft. on New York Bay, between Forty-eighth and Center streets, on which the company will build a new plant, including a two-story reinforced concrete warehouse with a floor area of nearly 144,000 sq. ft., also a foundry and machine shop.

Nashua Machine Co., Nashua, N. H., which, as announced in last month's issue, has purchased the Bundy trap business from the American Radiator Co., has opened a selling department at 127 Federal street, Boston, in charge of John Sabin, who was one of the first to introduce a tilting trap on the market.

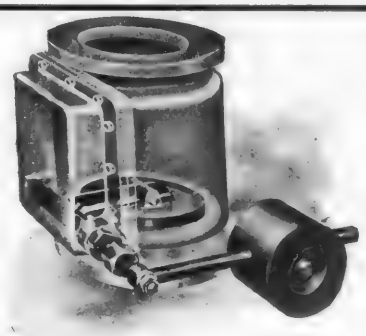
McCrum-Howell Co., New York, announces the appointment of Howard T. Gates as general sales manager and Ernest E. Bell as eastern sales manager. The company's western sales manager is A. H. Schroth, who was appointed to that office January 1, 1911. George L. Greenman has resigned as the company's assistant sales manager to become eastern general manager of the Richmond Sales Company.

Goulds Mfg. Co., Seneca Falls, N. Y., manufacturer of pumps, will build a $250,000 addition to its plant at that place.

Central Foundry Co., New York, manufacturer of soil pipe and fittings, which has been for some time in the hands of a receiver, has been reorganized with Receiver Waddill Catchings as president; De Courcey Cleveland, secretary and treasurer, and W. H. Feltt, assistant secretary and treasurer. The new company has sold $1,000,000 in bonds and will start business with the proceeds. The directors include J. N. Wallace, C. S. Smithers, August Heckscher, G. B. Malleck, N. B. Dill, P. J. Goodhart and G. H. Kinnicut.

H. Mueller Mfg. Co., Decatur, Ill., is improving its plant by the addition of a boiler house, a two-story brick building, 100 ft. square, which will furnish over 1000 H. P., or nearly double the former capacity of the plant. Additional machinery is also being added.

Shirley Radiator and Foundry Co., Shirley, Ind., announces the appointment of C. E. Gates as general manager of the



EXCELSIOR STRAIGHTWAY BACK PRESSURE VALVE

A glance at the illustration will show its extreme simplicity and freedom from complicated parts. It has an area through the seat equal to that of the pipe.

As a back pressure valve it can be used in a vertical or horizontal position. It is especially desirable for exhaust steam heating. Also well adapted for use as a relief or free exhaust valve for condensing engines.

JENKINS BROS., New York, Boston, Philadelphia, Chicago

company. Additions are being built to the plant at Shirley, which will more than double its present capacity.

Garden City Fan Co., Chicago, announced the contemplated removal of its plant from Niles, Mich., owing to the failure of the Evans Heating and Plumbing Co. to include its apparatus in the mechanical equipment of the Niles High School building. Ten petitions have been circulated by residents of Niles petitioning the board of education to refuse to permit the installation of any other system.

Cutler-Hammer Mfg. Co., New York, announces the establishment of a new department to be devoted exclusively to the manufacture of industrial appliances for industrial heating. The department will be in charge of W. S. Hadaway, Jr.

Consolidated Engineering Co., Chicago, announces that in its suit against the Monash-Younker Co. for infringement of its Thermofier valve, Judge Sanborn, in the United States Circuit Court in Chicago, entered an order on March 16, 1911, in favor of the Consolidated Engineering Company for an injunction restraining the defendants from selling or installing the "Monash New Noiseless Radifier Valve." On appeal the Circuit Court allowed a supersedeas upon the condition that the Monash-Younker file within ten days a supersedeas bond in the penal sum of $10,000.

Buffalo Forge Company, Buffalo, N. Y., reports that its forge department is unusually busy with export orders for large installation of the Buffalo patented down draft forges in foreign railroad and industrial plants. Among these are the Havana Railways, Havana, Cuba, and the Central Railroad of Brazil.

Sprague Electric Company has been merged with The General Electric Company of Schenectady, N. Y. Its business will be connected under the name Sprague Electric Works of General Electric Company. The manufacture and sale of the lines of apparatus and supplies heretofore exploited by the Sprague Electric Company will be continued by the Sprague Electric Works of General Electric Company under the same organization, with D. C. Durland in charge as general manager. The offices of the Sprague Electric Works will be continued as heretofore, with main offices at 527-531 West 34th street, New York, and branch offices in principal cities.

New Incorporations

Frank Miller Plumbing and Heating Co., Toledo, O., capital $10.000.

Wetherell Heating and Plumbing Co., Carthage, Mo., capital $15,000. Incorporators: C. N. Wetherell, D. N. Wetherell and E. A. Wetherell.

Frush Plumbing Co., Waterloo, Ia., capital $25,000. President, George H. Frush; vice-president, William J. Cosgrove; secretary, Stephen Nullany; treasurer, G. D. Bertram.

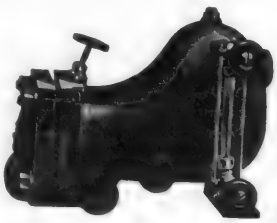
Contracts Awarded

Frank Leary, Little Falls, N. Y., heating county farm buildings, for $7,366.

R. J. Mercer & Co., Traverse City, Mich., heating and plumbing new hotel at Boyne City, for $7,000. A vacuum heating system will be installed.

BETTER THAN LEAD Dixon's Pipe Joint Compound is better and cheaper than red or white lead.
Doesn't "set" joints—goes farther.
JOSEPH DIXON CRUCIBLE COMPANY, Jersey City, N. J.

McDaniel Improved Steam Trap
WILL DO THE WORK



When you need a Steam Trap buy one you know will work. With a McDANIEL we take all the chances. Don't pay until you are satisfied. We have been 25 years manufacturing Steam Traps and know there is no better trap made. May we send you one for trial?

Watson & McDaniel Co.
160 North 7th Street • PHILADELPHIA, PA.
Send for Catalogue

Hoffman & Conklin Co., Columbus, O., heating and ventilating new Bertha avenue and Hedges street schools in Mansfield, O.

Muller Heating Co., Milwaukee, Wis., heating and ventilating public school building at Sun Prairie, Wis., for $5,385.

America Heating Co., Rockford, Ill., heating South Park Lutheran Church in Rockford.

Buffalo Forge Co., Buffalo, N. Y., installing 9-ft. fan, pipe coil heaters and galvanized air ducts complete, in the dye-house of the Farr Alpaca Company's Mill No. 2, at Holyoke, Mass. The system is similar to one installed a year ago at this plant by the same company and which has proven wholly satisfactory.

J. T. Cullen, of the Star Boiler Works, Clinton, Ia., contract to construct the new heating plant at the courthouse in Clinton, for $3,957. Two new boilers will be included in the installation, each 60 in. in diameter and 16 ft. long.

Probst Bros., Columbus, O., were lowest bidders, at $2,966.90, for the heating and plumbing of the Marion School in Columbus O.

Ahern-McCoy Co., Fond du Lac, Wis., heating, plumbing and gas fitting for the new $85,000 building of the Wisconsin Telephone Co., at Fond du Lac; also heating and plumbing the new Armory building.

J. C. Hurley, San Francisco, Cal., heating system and power house equipment for the new Odd Fellows' Home, near Los Gatos. The work will amount to $28,647. A vacuum cleaning system, costing $3,985, will be installed by the Vacuum Engineering Co.

American Warming and Ventilating Co., Pittsburg, Pa., heating and ventilating new $75,000 office building for the Republic Iron and Steel Co., at Pittsburg.

Trade Literature

Guaranteed Coal Saving, published by Frank L. Patterson & Co., 26 Cortlandt street, New York, is a new and timely catalogue designed to show how a considerable part of the fuel appropriation can be turned into profit by means of the Patterson-Berryman feed-water heater and purifier. The Patterson-Berryman apparatus is shown both in upright and horizontal styles for various requirements and the argument for Patterson-Berryman heater versus open heaters is presented at length. Views and descriptive matter are also given of the Patterson hot water service heater and of the Patterson exhaust pipe head. The catalogue closes with an impressive list of installations. Size 6x9 in. Pp. 48.

Plenty of Warm Air at
Just the Right Temperature
is furnished independent of wind or weather
by the

Sturtevant

Heating System

Now is the time to be considering any system you must install before next winter. We will gladly point out to you the merits of our system.

Our Treatise, 112-V, describes and illustrates its application to various classes of buildings. We send this treatise on request.

B. F. STURTEVANT CO.

Hyde Park, Mass.

810

Buffalo Spray Nozzles and Strainers, made by the Buffalo Forge Co., Buffalo, N. Y., are presented in a new circular showing their adaptation for chemical plants, blast furnaces, mine moistening, gas washing, condenser systems, paper mills, cooling towers, agricultural purposes and for spraying insecticides. Size 4¼x8 in. Pp. 16.

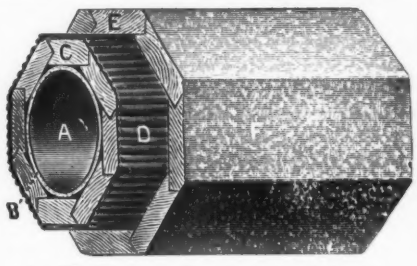
Argon Valve, described as an automatic steam and hot water valve which will work under all conditions, is illustrated and described in circular matter published by the Argon Mfg. Co., Denver, Colo.

What Heat for Your House? a primer for the man who is about to build a new house or make an old house comfortable, is a useful compendium of information that cannot fail to give a clearer understanding of the subject to the layman as well as to many in the trade. The well-known advantages of steam and hot water for warming purposes are tersely pointed out and the adaptability of the Pierce boiler is treated in a separate chapter. The book is published by Pierce, Butler & Pierce Mfg. Co., Syracuse, N. Y., and no doubt a copy can be had for the asking. Size 4¼x6½ in. Pp. 34.

Wyoming Automatic Eliminator and Wyoming Steam Trap, now marketed by the Potter Separator Co., Newburgh, N. Y., are the subject of a handsome catalogue well worth having. The Wyoming Automatic Eliminator is a device to get rid of the water in the steam line and its construction and operation are presented at length. It is made in vertical and horizontal types for steam pipes measuring from 3 to 16 in. in diameter. The Wyoming Steam Trap is shown to be a compact device which does not depend upon the buoyancy of the float to lift the discharge valve, the float being only instrumental in releasing a latch at its highest and lowest points of travel which, in turn, opens or closes the discharge valve. An interesting list of users is included in the catalogue, both the steam trap and Eliminator having been manufactured for some time by W. H. Nicholson & Co., of Wilkes-Barre, Pa. Catalogues of both devices may be obtained from the Potter Separator Co., either through its Newburgh office or at 39 Cortlandt street, New York. Size 6¼x9½ in. Pp. 24.

Ideal Sylphon Heating Specialties, for controlling steam and water heating systems, tank water supply, etc., and made by the American Radiator Co., Chicago, are embraced in a newly-issued catalogue of more than ordinary attractiveness, giving, under one cover, detailed descriptions with illustrations, of Ideal Sylphon tank water regulators, Sylphon regitherms for steam or water boilers, hot air furnaces, gas supply regulation and

Wyckoff's



A—Tin Lining
B—Asbestos
C—Wood
D—Corrugated Paper
E—Wood
F—Asphaltum Coating

A Patent Steam Pipe Covering Of More Than Ordinary Quality

Note particularly the construction. First a tin lining, then a layer of asbestos, then a lagging of wood over which comes two coats of corrugated paper, another layer of wood and a coat of asphaltum. Rather a discouraging combination for heat to escape through.

The most absolutely non-conductive, waterproof covering on the market. Send for a copy of the Wyckoff Red Book—it contains complete details.

A. Wyckoff & Son Co.
ELMIRA, NEW YORK

central heating; Sylphon steam regulators, Sylphon water regulators for hot water boilers or tank heaters, Sylphon tank regulators for holding the supply water at any desired temperature; also Sylphon vapor regulator for regulating dampers of vapor or atmospheric heating, Sylphon packless radiator valve, Sylphon automatic air valves, vacuum valves and vent valves; and Sylphon reducing valves for steady pressure reduction. The whole is included in a compact little volume which easily fits in the hip pocket or may be easily filed. Size 4½x7¼ in. Pp. 40.

Marsh Quick-Opening Double-Heat Valves, made by the Marsh Valve Co., Dunkirk, N. Y., is a comparatively new valve and is shown in recently-issued circular matter in which the claim of superiority is made not only on account of the quick-opening and positive seal, but also that the metal lines are exceptionally heavy, and that the material, workmanship and finish are above those usually found. Two features of this valve are especially mentioned. One is that through the use of right and left-hand threads, working against each other, advancing a disc holder off the end of valve stem in closing valve, and by the use of high pitch threads in the valve bonnet, and low-pitch threads in the disc holder, the valve is operated with about one-third the number of turns required to open and close an ordinary valve. Through the use of low-pitch threads in advancing the disc holder off the end of the valve stem, the same grip or seating force is acquired as with low-pitch threads. The second feature is that in opening the valve, the disc in the top of the upper disc holder is seated in the valve bonnet in the same manner and with the same force in which the disc is seated in the bottom of the valve in closing same, thus providing against any possibility of leakage of steam or water around the valve stem or out through the stuffing box. The circular is well illustrated and contains price lists for sizes running from ½ in. to 3 in. for the Marsh standard globe valves and from ½ in. to 2 in. for the globe and angle radiator valves. Size 3¾x8¾ in. Pp. 18 (double fold).

District Heating Steam Plants, a paper by Paul Mueller, manager of the Erie Co., Erie, Pa., read before the American Society of Municipal Improvements, at Erie in October, 1910; also "The Development and Application of Central Station Heating," by Charles R. Bishop, read before the Pennsylvania Electric Association at Glen Summit Springs in September, 1910, have been reprinted by the American District Steam Co., No. Tonawanda, N. Y., and we understand that copies may be had for the asking. They are published as Bulletins Nos. 122 and 121, respectively.

Sparks System of Positive Steam Circulation, which is now owned and marketed by the Iroquois Engineering Co., Chicago, is the subject of an elaborate, new catalogue, which opens with a review of the principle of vacuum heating and then presents photographic reproductions of a number of representative buildings that have been equipped with the Sparks system. Interesting charts are presented showing record of vacuum in air line with pressure and when operating in connection with the Sparks system. The catalogue closes with detail

FOR SALE

Best Automatic Air Valve Made

PATENTS BROAD AND BASIC

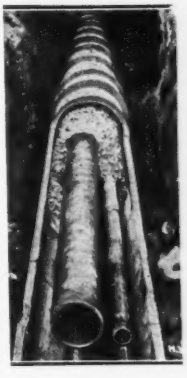
Valve is well known and a big seller. All necessary equipment included. Only small capital required. Exceptional opportunity.

For particulars, address

The Argon Mfg. Co.

DENVER

J-M Sectional Conduit



This is a tile conduit, salt-glazed inside and out. Is absolutely watertight.

Acids, gases or the action of the earth do not affect it. Neither can it be injured by weight or movement of pipes. Practically indestructible.

Easily opened after installation. Can even be taken up and relaid. The most efficient conduit for conveying steam, gas, water, brine or other liquids under ground.

Saves 90% of heat lost in transmission through unprotected or poorly insulated pipes.

Write for Catalog

H. W. JOHNS-MANVILLE CO.

Baltimore, Boston, Chicago, Cleveland, Dallas, Detroit, Kansas City, London, Los Angeles, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburg, San Francisco, Seattle, St. Louis

(1384)

views of the Sparks devices, with full description of the mechanism and operation. Size 6x9 in. (standard). Pp. 48.

Paul Steam System Company's Return Line Valve is a new device which, it is stated, will discharge air and water at 50 lbs. pressure or 20 in. of vacuum, but absolutely no steam. It is announced that it will be sold without a royalty charge. The valve is being marketed by the Automatic Heating Co., acting as sales agents, West Street Building, New York, and Fisher Building, Chicago.

Dunham Vacuo-Vapor System of Heating, and the application of the Dunham radiator trap to vacuum steam heating, is the title of a handsomely gotten-up catalogue lately published by the C. A. Dunham Co., Marshalltown, Ia. The well-known Dunham devices are shown in new views and the Dunham vacuo-vapor system is illustrated and described in detail. Nine advantages of this system are stated to be: the system is a sealed one, it gives forced circulation of steam, perfect control of heat, a fool-proof system, a noiseless system, a system anyone can operate, a system in which either hot water or steam radiators may be used, no waste of water or steam, and last, it furnishes a hot water supply. Many buildings are shown in which the Dunham system is installed, the list including the Sherman Hotel in Chicago, where the recent Master Steam Fitters' convention was held. Size 6x9¼ in. Pp. 68.

Cochrane Engineering Leaflet No. 6 is an interesting pamphlet describing a special boiler feed water heater for heating two water supplies separately and apart. The pamphlet is published by the Harrison Safety Boiler Works, 3189 North 17th street, Philadelphia, Pa. The heater is, in general, of the well-known Cochrane open type, receiving the exhaust steam through an attached oil separator. The water supplies, however, are received in two separate distributing boxes, which deliver to separate heating trays, from which the water drops into separate storage chambers, the idea being that in many plants there are two different water supplies which are used for two different purposes, as, for instance, where the condensed returns or condensate from surface condensers is to be used for washing or dyeing, while city or well water is used in the boilers. As compared with heating the two different water supplies separately in two different heaters, this arrangement represents a considerable saving on cost of heaters and of valves, piping, etc., while occupying much less room, and being more compact and convenient. The arrangement is designed to be used with the several modifications of the Cochrane heater.

Any Automatic Valve is Detrimental to a Vacuum Steam Heating System

Automatic Valves are Unnecessary with the

ARMAK SYSTEM

Send for Bulletin No. 2
Containing Particulars with Illustrations

ARTHUR McGONAGLE
136 Liberty Street, New York